CHEMICAL LIBRARY

AMERICAN JOURNAL of PHARMACY

SINCE 1825

A Record of the Progress of Pharmacy and the Allied Sciences

COMMITTEE ON PUBLICATION

Charles H. LaWall, Ph. M., Sc. D. Joseph W. England, Ph. M. J. W. Sturmer, Pharm. D.
John K. Thum, Ph. M. Arno Viehoever, Ph. D. E. Fullerton Cook, Ph. M.
IVOR GRIFFITH, Ph. M., Editor
Henry Leffmann, A. M., M. D., Special Contributor

Vol. 99 FEBRUARY, 1927 No. 2

CONTENTS

Editorial:

Industrial Alcohol Menaced Again 53

Original Articles:

My Lady Nicotine. By Ivor Griffith, Philadelphia 57

Research on Pharmacopœial Problems 83

Abstracted and Reprinted Articles:

Present-Day Beverages from a Health Standpoint. By J. W. Sale, Washington, D. C. (Reprinted from *Long Island Medical Journal.*) 98

Correspondence 104

Scientific and Technical Abstracts 105

Medical and Pharmaceutical Notes 110

News Items and Personal Notes 112

Book Reviews 119

Price $3.00 per Annum in Advance **Foreign Postage, 25 Cents Extra**

Single Numbers, 30 Cents. Back Numbers, 50 Cents

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa., Under the Act of March 3, 1879

Acceptance for Mailing at Special Rate of Postage Provided for in Section 1103, Act of October 3, 1917. Authorized February 15, 1918

PUBLISHED MONTHLY BY THE

Philadelphia College of Pharmacy and Science

145 North Tenth Street, Philadelphia

American Journal of Pharmacy

ESTABLISHED IN 1825

Four preliminary numbers were published at different times until in 1829, when the publication of the regular volumes began. Since then the publication has been uninterrupted. During the period from 1829 to 1852 four numbers were published annually, except in 1847, when five numbers were published. From 1853 to 1870 six numbers were published. Since this time twelve numbers have been published annually.

MANUSCRIPTS should be sent to the Editor. It should be stated in this connection that the Editor does not assume any responsibility in connection with the views or investigations of contributors, other than to exercise general care in the selection of matter.

Contributors are allowed a reasonable number of copies of this JOURNAL, free of charge, if applied for when the proof is returned.

REPRINTS, if desired, must be applied for when the proof is returned. The table below shows the *approximate* cost of reprints, the make-up of the pages to be identically the same as in the JOURNAL. The actual cost may vary from the figures given, and will depend upon the amount of presswork, paper, binding, etc. Reprints containing half-tones may be expected to cost somewhat more than the rates given.

	2 pp.	4 pp.	8 pp.	16 pp.
25 copies	$2.25	$3.75	$7.75	$9.00
50 "	2.50	4.00	8.25	9.75
100 "	2.75	4.25	9.00	10.75
250 "	3.75	4.75	10.00	12.00

COVERS WITH TITLES	
25 copies	$1.75
50 "	2.00
100 "	2.25
250 "	2.75

☞ Our readers will find it to their advantage to carefully consult the advertising pages when desiring to correspond with STRICTLY FIRST-CLASS PARTIES.

THE AMERICAN
JOURNAL OF PHARMACY

VOL. 99 FEBRUARY, 1927 NO. 2

EDITORIAL

INDUSTRIAL ALCOHOL MENACED AGAIN

POOR Uncle Sam——

Ever since he opened his purse-strings to the war-torn lands of Europe his popularity there has suffered a sad decline.

Elsewhere too—from Trotsky town to Timbuctoo—the bulge of his handy money-bags has inspired many a wicked slam.

His "Foreign Relations" indeed, have never been unduly courteous to him—except perhaps when policy demanded politeness.

Which all goes to make him a domesticated, isolated, more or less, contented tenant of his own vast spread of landscape.

But his domesticity is no guarantee of immunity against slam and slander for sporadically even his own ridiculous nephews cast mud at his dignified person.

The latest abuse done to him is to involve him in murder deals.

Like the Borgias of old—so his incriminators allege—he dopes his wines with vicious poisons, and invites his friends to dine and die!

And his incriminators are legion. Some are well-meaning but sadly misinformed. Others itching for notoriety, parade their opinions in public prints, and affect them as facts.

Still others bleat and whinny, totally ignorant of the real essence of things, yet wholly in sympathy with any cause that accepts their asinine accompaniments.

Many years ago—long before Prohibition began and ended—Uncle Sam copied from one of his foreign relations a scheme whereby legitimate users of alcohol in industry, might procure this commodity, without the necessity of paying a tax on it. So that none of this tax free alcohol might be diverted to beverage purposes there was added to it a small percentage of wood alcohol, which rather increased its industrial solvent value, but made it difficult for its illegal diversion.

In other words it was Denatured. Industry got accustomed to its use and millions of gallons of it found a perfectly legitimate use in the paint and varnish trade—in the hat industry—and in many other avenues of business.

But along came a brand new law—the Eighteenth Amendment—Prohibition and its ramifications—a request from a majority of Uncle Sam's few million nephews and nieces that the drinking of alcohol be stopped except for medicinal purposes.

So legitimate alcoholic liquor could no longer be procured except for medicine but there nevertheless existed a wide market for intoxicating liquor. To satisfy this market the business of bootlegging appeared.

Intrinsically a crooked business—this bootlegging naturally drew its supplies from crooked origins. Smuggling, stealing, cheating, illicit distilling—and finally diversion of industrial material—all shared in furnishing the necessary alcohol.

But Uncle Sam was not going to be so easily outwitted and he ordered his chemists to devise new denaturing substances, which would still permit alcohol to be used in industry or in external medicine, and yet render it unfit for internal consumption and illegal diversion.

To this work the chemists applied themselves thoroughly and gradually turned out a formidable list of denaturing formulas, suitable to the various industries involved.

Obviously the denaturing compounds were such as could not be readily separated from the grain alcohol—were intensely repugnant to the taste—and in instances were poisonous.

And that is how Uncle Sam came to be labelled a "poisoner" by some of his erratic nephews.

When industrial alcohol, some twenty years ago, was tax-emancipated, it was only in spite of a bitter fight staged by ignorant fanatics who could see in this useful, necessary solvent, nothing but a stomach-pickling beverage.

But that was before Prohibition. Strangely enough the tables have turned and the ridiculous nephews who now accuse their indulgent uncle of wholesale poisoning are not prohibitionists but anti-prohibitionsts.

This motley crowds seeks to make a single issue of the "poison alcohol" myth—and the prohibition law—and so disturb the public mind as to the real issue.

Prohibition, they say, is responsible for "the greatest poisoning plot in the world's history."

A Dr. Norris, Medical Examiner for the City of New York, recently attracted a great deal of attention with a long-winded report submitted to the Mayor of New York, in which he records his opinions and his findings on deaths due to "bad liquor."

Full of contradictions—replete with chemical misinformation and with misleading inferences—it found a merry welcome in cosmopolitan newspapers. One newspaper, facetiously, yet correctly stated, that certain high officials in the city were so appalled by the report that they promptly sailed to Havana.

"Morally, if not legally, the United States Government stands charged with responsibility for the deaths of scores who died from drinking government -poisoned liquor during the holidays. The Government knows it is not stopping drinking by putting poison in its alcohol," declared Dr. Norrs.

He further called attention to the toxic nature of the denaturing substances and specified their toxic dose and described their fatal symptoms. He did *not* call attention however to the fact that to secure the stated fatal dose would require, in several instances, the consumption of from *a gallon to two gallons* of the illicit beverage.

Long before the denaturant would have pressed the vital throttle, the content of alcohol itself would have killed the consumer.

In 1926, with its vast increase in population, New York City had only 741 reported alcoholic deaths against 621 in 1910. The increase is only consonant with increase in populace—and in 1910 there was no prohibition—no bad liquor (?) and *no* special incentive for seeking symptoms and parading reports.

So much for the Norris report, which in spite or because of its asininity found a great crowd of judges, lawyers and Senators and newspaper editors eager to accept and to broadcast its ridiculous findings.

Fortunately, however, there were others who saw the light and detected that the movement for abolishing poisonous denaturants had a sinister impetus.

Why should the government be considered at fault for denaturing its industrial alcohol any more that the Public Utility Company that sells gas or electric current—or the store that sells rope or paris green—or the municipality that builds a bridge over its river

and so affords a suicidal spot for silly fools who seek such a means to an end?

Answering criticism of the Government's poison-alcohol policy on the floor of the Senate, Senator Sheppard of Texas, declared quite correctly that alcohol itself is poison, and "you can't poison poison." "The lamentable deaths from alcoholism," said the Texas Senator, "sustain the Prohibition argument that beverage alcohol is so dangerous to many people that it constitutes a menace to society." Spokesmen for some of the leading industrial groups using denatured alcohol are opposed to any change in the Government's poison policy, and denounce the outcry against it as "sinister." And a Washington correspondent of the Baltimore *Sun* quoted high officials in charge of Prohibition enforcement as saying that "the chances of poisoning from imperfectly distilled alcohols are far greater than those from industrial alcohol."

But the political pressure brought by the "ridiculous nephews" was almost successful in upsetting the Government's plan. They wanted to destroy the "system" yet had nothing to offer in its stead—which is so often the way with sap reformers.

For the time being, however, we are glad to learn that sanity prevailed and that the Secretary of the Treasury reports that his department "has not the discretion, under existing law, to abandon an effective denaturant in favor of one not harmful but ineffective."

The interests of the Government and the welfare of industrial consumers of denatured alcohol, thus continue to be protected and in the meantime research goes on to find perhaps, what will prove an "ideal" denaturant.

IVOR GRIFFITH.

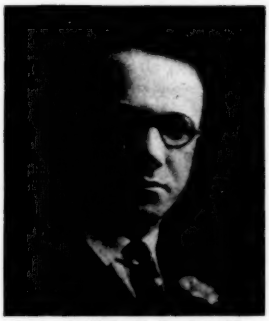
ORIGINAL ARTICLES

MY LADY NICOTINE*

By Ivor Griffith, P. D., Ph. M.

Assistant Professor of Pharmacy at the Philadelphia College of Pharmacy and Science; Professor of Organic Chemistry, Wagner Free Institute of Science, Philadelphia.

IT MAY not be particularly to the credit of the speaker of this evening to have elected for the topic of his discourse in this series of Popular Science Lectures, a subject so distinctly controversial as this Tale of Tobacco. Yet there is not in this day the vicious antagonism to the sovereign weed that existed and exhibited itself some few generations ago. Poets and preachers, kings and cardinals, joined in the word-slinging campaign, so vigorously waged, to suppress the then-called "filthy tobacco evil." Awe-inspiring were the tirades hurled at it; dictionaries were plundered to provide poets and preachers with punishing puns and even a king of Merrie England lent his wit, or borrowed his wit, to write an awful essay entitled "A Counterblaste Against Tobacco."



Ivor Griffith, P. D., Ph. M.

The discovery of tobacco was practically coincident with the discovery of America. Columbus and Company, as truthful histories record, brought back from their newly-found world much more than just news of their trip. As some unkind historian has put it—"Tobacco was not the only disease that the Pinta and the Nina and the Santa Maria brought back."

When those hardy explorers landed in the New World one of the sights that most bewitched them was to see the natives of the Indies "roll their own" and belch their smoke from lips and nostrils. This smoking business rather appealed to the white man, and it was not long before he exchanged habits with Lo, the poor Indian. Exchanging bad habits works inversely like exchanging ideas. When two parties barter ideas, both parties benefit, but after Lo and the

*One of a Series of Popular Science Lectures delivered at the Philadelphia College of Pharmacy and Science, 1926-1927 Season.

Spaniard had exchanged their bad habits, both had gained in iniquity—each had both the firewater and the tobacco habit.

So to Europe came the weed. Spain, of course, was its first love and decades before England knew aught of its existence, the courts of Phillip and Isabella reeked with the blue haze of tobacco combustion.

WHEN GOOD QUEEN BESS RULED ENGLAND

In 1564, when good Queen Bess ruled England, some of her polite freebooters visited the new Continent, and on their return introduced the pipe, if not to Elizabeth, at least to her sturdy subjects. Admiral John 'Awkins, Sir Walter Raleigh and Francis Drake all vie for the credit of bringing the weed to England. Of the three, Walter apparently had the best publicity manager—for what schoolboy has not been thrilled by the story of the gallantry that cost him, so History tells, a perfectly gorgeous coat. But who would not have done precisely the same thing under the same circumstances—so cheaply to earn a Monarch's gratitude. Chances are that for a shilling or two the coat came back from the dry-cleaning shop—looking "as good as new."

Then there is that other story of Walter's first smoke in public, and how his Irish servant, observing smoke creep from his master's nostrils, thought him on fire and drenched him with a generous piece of the River Shannon. On his estate at Youghal in Ireland, Raleigh grew his own tobacco, planted from seed that came from Virginia.

But when James the I ascended the throne vacated by Elizabeth—came a new turn on things. James hated Raleigh, who had been Lady Nicotine's and Elizabeth's petted favorite—and James had a perfect right to show aversion, for his mother, Queen of the Scots, had perished at Elizabeth's orders.

Tobacco, too, was a Protestant weed and James never loved Protestants. So it was not long after he donned the ermine robe, this comical king showed his teeth to tobacco. At his request the Prohibition of Tobacco was formally discussed in the dignified House of Commons—and its proponents were so eloquent, and the business of displeasing the King more eloquent still, that the Sovereign Herb became a weed indeed in England. Its use was forbidden and dire penalties imposed on Cavaliers who might be found carrying a pouch of Virginia shag upon their hips. Yet strangely enough, so a commentator of the day records, pipes were still sold in the shops, and tobacco pouches, and pipe cleaners.

Tobacco with strange labels, immature or adulterated with chestnut leaves and Irish cabbage, was clandestinely sold, and at exorbitant prices, and men who engaged in this nefarious trade were called bootleggers,† because it was in their high leather leggings that their stock in trade was carried.

Yet there was, so we are told, a legitimate use for the weed in medicine—and recognizing this need, the law permitted its purchase in certain restricted quantities, providing, of course, that dealers in medicines and practicing physicians were duly and properly licensed.

It was even whispered about that members of Parliament frequently left their country and crossed the channel to France—on official business, 'twas said, yet only to smoke in safety.† Among the rich, surreptitious smoking grew into a great fashion, and it is said that the habit was more and more indulged in as the years went on.

Discontent and disregard of law infected everybody in the land. The far-famed English liberty bunioned at the ankles for weight of ridiculous chains. But why continue so involved a story—sufficient has been told to relate what terrible days were upon Merrie England when whims of Kings—half-witted Kings at that—dictated the laws of the land. How wiser has our world grown—how much more tolerant! (?)

Today the tobacco habit has become so general that one seldom meets with any formidable criticism of it. What potential dangers may be in its over-exercise have been too readily forgotten. It is not in the fashion today to be antagonistic to tobacco.

And fashion is funny anyhow. There is a fashion to every phase of life. Indeed one might say that Evolution is simply fashion. Times change, people change, habits change, circumstances change, and here perhaps is where Life's beauty resides.

The pulse of Life vibrates with change of habits, and of actions. Possibly man's foolishness is as necessary to his comfort as is his great wisdom. He steps in error and falls to meet his penalty—he achieves and is thrilled with satisfaction—failure and success—experiment and proven practice alternate in dizzy cycles.

†Philologists please do not copy. This information can not be authenticated.

†History repeats itself. Quite recently the mayor of a large American city, shortly after receiving a report on "Deaths from Poison Liquor," showed his reaction to it by spending his vacation "crossing the channel" to Havana, which is in Cuba.

And it is not strange that History so often warms up its cooked goose and serves it to several separate ages—for man himself is but one of the changing fashions in the infinite scheme of creation.

HISTORY WARMS UP THE COOKED GOOSE

So it may be that the day will again repeat itself when Tobacco, too, will be taboo in every circle of society. Today, however, my Lady Nicotine enjoys an unusual popularity. Who slanders the lady commands no audience.

The invention of the lucifer or match also helped to light the way for my Lady's progress—for people smoked more when lighting the pipe was made easier for them. I doubt very much if many of us would smoke did we have to light our cigars with a tinder box or flint. It is bad enough when we have to be bothered with these new-fangled Christmas present contraptions, devised to replace matches, which light only when the spirit moves them—and half the time the spirit has evaporated.

So we say that tobacco went marching on and today, especially to one who acknowledges a daily delight at the shrine of the Lady of Sinuous Smoke, no criticism carries much weight. In his famous Ode to Tobacco, Calverley the English poet, most clearly sings the song of the confirmed tobacco lover:

I have a liking old
For thee, though manifold
Stories, I know are told
Not to thy credit.
How one (or two at most)
Drops made a cat a ghost,
Still why deny thy use
Thoughtfully taken.
We're not as tabbies are—
Smith, take a fresh cigar;
Jones, the tobacco jar;
Here's to thee Bacon!!

But I cannot refrain from referring at greater length to

The gentleman called King James
In quilted doublet and great trunk breeches,
Who held in abhorrence tobacco and witches.

His "Counterblaste to Tobacco" was a giddy piece of literature—and yet so quaintly written and so sensibly in spots, that one wonders what manner of man was this James, who could be so wise on paper and so silly a fool in practice.

This work first appeared anonymously in 1605, but when it

seemed to have gained favor with the feminine and the effeminate portion of England's people, it was acknowledged as the handiwork of his Majesty the King. When the King so boldly opposed this "fierce vice" quite naturally the worms and parasites that infested his Court likewise protested with horror the wave of smoke-mania that rolled over England.

"Smoke," states the royal *counterblaste,* "becomes a kitchen far better than a dining chamber; and yet it makes a kitchen* ofttimes in the inward parts of men, soyling and infecting with an unctuous and oyley kind of soote, as hath been found in some great tobacco takers, opened after death." James, you see, clinched his arguments as some of our great surgeons do, who demonstrate the success of an intimate carving technique, during the post-mortem that follows the successful operation. But that is another story.

Listen to the logical acumen of this: "Why," he asks, "since we imitate the beastly and slavish Indians in taking tobacco, do we not imitate them in walking about with no clothes save a bunch of foolish feathers?" Quite an odd, even if logical argument, to come from one who day and night wore a quilted dagger-proof vest. Then comes the famous climax.

"A Custom Loathsome to the Eye—Hateful to the Nose, Harmful to the Brains, Dangerous to the Lunges, and in the black stinking fume thereof nearest the Horrible Stygian Smoke of the Pit that is Ranke and Bottomless."

But these effusions of the "wisest fool in Christendom" availed but little, and my Lady Nicotine continued to extend her domain to every corner of England. Some say that it was King James' jealousy of Sir Walter Raleigh that embittered him so to the weed which Sir Walter first brought to England. History further records that when the King saw the trend of the times and the onward march of Tobacco, he very artfully introduced the business of inordinately taxing the weed and so filled his coffers with riches. He was consistent, though, in that he never fell into the habit, at least not publicly.

His Prohibition of Tobacco lasted only a short while, but his idea of taxation has lasted ever since. The bit of blue stamp on my cigar box is a relic of a plan of money-grabbing fostered by that idiotic English monarch. Exit King James.

But opposition to tobacco did not die with James—for the world,

*To what kind of kitchens was King James accustomed?

even then, was much greater than England. In every country wherein my Lady entered she encountered rabid opposition.

PERSIA PROHIBITS TOBACCO

In Persia, Abbas I, of hideous memory, ruled that for those who dared to smoke, their lips would be promptly ripped off—"like bark from the birch tree"—and the noses of any who ventured to snuff would likewise be bobbed. Strange to relate old Abbas himself at last succumbed to the weed—and bobbed noses were no longer the vogue.

The Turks, too, suffered like indignities till one of their seventeenth century rulers, probably reading a high-powered ad in the Turkish *Saturday Evening Post*—turned to the lure of the brand "that satisfies." Anyway, opposition to Tobacco ceased in Turkey about that time and the unspeakable Turk turned to a new kind of atrocity. These atrocities are now put up in packages.

In Russia, too, the use of tobacco was banned—the first offense was penalized by a nasal operation without ether—if guilty of second offense death only could wipe out the crime. The Czar Federowitz encouraged the cultivation of whiskers as an additional fire hazard against the progress of the fiery stogie. But nothing hindered the world-wide ambitions of the herb of the Indies—insuperable obstacles only seemed to spur it on.

Profiting by the experience of Persia and Russia and the land of King James—America, the native land of Lady Nicotine (where happy Indians, long before the white man's coming, had drawn contentment from a common calumet), thwarted my Lady's progress not with force of punishment and penalty, but rather by force of argument and propaganda. So late as 1883—there was a voluminous literature dedicated to the anti-tobacco question, and to read these products of mental fermentation, provides in this enlightened day, not inspiration, not admiration, but a fine and salubrious amusement.

I have before me as I write, a volume entitled "Anti-Tobacco," written by Abiel Abbott Livermore, and others. Abiel and the others have long since changed to silent, inorganic dust, but as I read through their doleful indictments, I wonder just how long these venerable Puritans from Boston-town would survive one trip around their beloved Commons on a balmy spring day in this year of our Lord 1927.

There they go—let us follow their spirit shadows. Everywhere gay signboards and posters scream at them with the urge of the numberless brands of tobaccos and smokes. Blood-red store fronts with

the sign of the shield, pour out their satisfied, couponed votaries. Lady Nicotine rules everywhere. Our Puritan friends lower their translucent eyes in shame, but even the sidewalks suggest "Ask Dad—He Knows"—and empty cartons and unfinished symphonies in cincos cause them to lift their compassionate gaze to the Heavens for comfort. And behold even there, hanging to the brim of a flying cloud, is the smoky message of an artful birdman:

"Chesterfields—They Satisfy."

But the finishing touch that sends the Puritanical ectoplasms back to, where I hope, is no smoke at all—is the personification of my Lady Nicotine herself—as she cuts across the Boston Common—knee deep in silken stockings, high-heeled in artful slippers, her raven locks close-trimmed—her face lifted and held secure in place with putty paste and pigments. Out of a crimson crevice crosswise on her face, protrudes a dainty and sweet—Caporal.

Obedient rings of perfumed smoke herald the haughty lady—this 1927 edition of my Lady Nicotine—the flapper herself—and you can hear the swish of Abiel and the others as their spirits rush on to their smokeless haunts, to be guarded forever by oodles of needles, through whose constricted eye no *Camel* can hope to pass.

I quote—now that the spirits have left—from Abiel's acetic essay:

> "The use of tobacco is an indignity to the Female Sex. I shall not discuss here the question whether a man can be a gentleman, and smoke or chew. Suffice it to say that every person conversant in society knows full well that the customs of a truly polite and refined community are often set at defiance; that the offensive spittoon (refined Bostonese for *cuspidor*) corrupts the air of the sitting room and parlor; that, worse still, the floors of churches, court houses, cars and steamers reek with the filthy expectorations of the chewer and smoker; that the sweet air of heaven, in which we all have a common right and interest, is blighted by the trail of smoke that the reeking pipe emits.
>
> "It is true that some women of old smoked their pipes and some still use the more dangerous cigarette; but as a general custom refined women are exempt from the evil. They detest and loathe it in their fathers, husbands and sons. How can pure and noble women endure the presence of men such as we meet daily on the streets whose lips are varnished over by the slimy juice, whose breath is a wicked stench, and whose clothing exhales the stale effluvia of countless dead cigars?"

And that is not a half of what Abiel uttered. I have long suspected that Abiel must have swallowed his first and only cigar butt—such bitterness and mental nausea could have been in no otherwise engendered.—Exit Abiel.

Enter now our Lady Nicotine. Her name she inherits from Jean Nicot, French Ambassador at Lisbon, who in 1560 sent some tobacco to Catherine di Medici as a cure for headache. Catherine was much pleased with it, but soon learned that smoking it was far more pleasurable than using it as a poultice. She became a devotee, and from this incident tobacco gained its synonyms of the "Queen's Herb" and "The Sovereign Weed."

Oveido, a classmate of Columbus, published a book entitled *"La Historia General des las Indias,"* in Seville in 1526, in which he mentions pipe smoking. In this book there is a small wood cut, which is the oldest known picture of a pipe. This pipe was shaped like a Y. The smoke was inhaled by placing the two ends in the nose and the tobacco leaves in the stem. Oviedo claims this pipe was called "tabaca" from which the name tobacco probably originated. A less plausible claim for the origin of the word "tobacco" is that "Tabaco," a province in Yucatan, is the parent word.

Jean Nicot's name was perpetuated in the word nicotine and its derivative forms.

LADY NICOTINE'S FAMILY

Lady Nicotine's botanical family, the Solanaceæ, like all large families, exhibits a variety of dispositions and natures. Some are good and some bad. This great solanaceous family comprises among its members the humble spud, of Irish origin; the New York Tom-*ah*-to or the Camden Tom-*ay*-to; the vivid red pepper and the obese egg plant. The family reunion—you may observe at your leisure in a can of Campbell's soup.

Then there are the more vicious members of the family—tobacco—henbane and horsenettle, and a great many others. Strangely enough, however, not a single member of the family is totally devoid of taint—for a poison exists at some time or other in every one of the group.

Even the mild and modest potato exhibits this taint at times. The blossoms, fruit and sprouts are apt to contain active poisons. Solanine, an alkaloid in action much like the volatile nicotine or non-volatile strychnine, is a perverse potato constituent. The tomato is also said to develop a small amount of a like ingredient.

But to return to Tobacco. I should like very much to have time to speak of the cultivation and preparation of the plant before it enters into its many avenues of use. The subject is entirely too ramified, however, to permit its complete survey.

Every phase of its handling must be expertly done if the final product is to be worthy. From the choice of seedlings—it is a perennial plant but yet annually planted from seed—and the selection of suitable soil and exposure—to the harvesting of the crop—and the special methods of sweating and preparing the leaf—then to the storage—the selection of sorts, the blending of them and the final manufacture of the cigar or cigarette—every step requires intelligent attention.

The industry today is so large, and the demands of the ultimate consumer so exacting even if not exact, that those engaged in the industry are forced to use strictly efficient methods in each department of the trade.

There are a great many varieties of tobacco all belonging to the genus Nicotiana, a sub-group of the Solanaceous family. Of this genus there are dozens of species or variants, yet one, *Nicotiana Tabacum* supplies almost the entire tobacco of commerce. It is said that over a hundred varieties of this species are grown in the United States alone. Havana, East Indian and European tobacco belong to the same species. Even the famous Vuelta tobacco of West Cuba, the most expensive in all the world, is offspring of this variety.

Other important species (*Rustica* and *Persica*) produce Persian, Turkish, Syrian, Latakia and other tobaccos. Not nearly so important is specie difference, however, in the nature of the finished tobacco, as the difference brought about by curing the leaf afterwards. For instance, the particular flavor of Latakia, a Syrian tobacco (from ancient Laodicea), contrary to the general impression, is produced by curing it over the burning branches of a variety of holly, ilex.

It should be remembered that there is no essential difference in origin in cigar, pipe smoking or cigarette tobaccos. The differences are physical and in quality only. All kinds, though they vary considerably in many characteristics, may be obtained from the same species or even the same variety of the species by suitable culture and crossing and curing. Soil conditions greatly alter the character of tobacco—thus a certain variety of seed planted in Lancaster County yields an entirely different product from that yielded by the same

variety planted in Connecticut or Cuba or Collingswood. Exposure also causes variation in the growing plant.

In Connecticut and elsewhere, so that the sun may not create too much stir in the constitution of the leaf, cheesecloth parasols protect the plant and the result is a fine elastic leaf, greatly demanded by the industry. Immense plantations in Porto Rico are completely covered by cheesecloth, and from a distance appear as if covered by snow. Sand and rainspots, too, leave their mark on the plant. Especially noticeable is this on Sumatra tobacco used as a wrapper in high-grade cigars. Brown and white spots on the leaf are said to be caused by little grains of sand sticking to the leaf and burning and bleaching it by gathering the heat of the sun to the spot. The dew or raindrop, too, that acts like a lens with the sun rays, is blamed for the same thing. It used to be said that such marks on the cigar leaf wrapper indicated good breeding—in the same way that finger nail white spots were at one time considered good omens.

So certain people in the cigar trade did to their wrappers what the sand or sun had overlooked, and a totally brunette cigar would be made to disport numberless blonde spots by merely sprinkling upon it droplets of strong peroxide.

Soil nature influences leaf color to a considerable extent. American cigar trade demands a light cigar—at least a light wrapper. John Brown judges his cigar—as he does a great many other things—by the cover—and by way of paradox, it might be said—that in so judging it he misjudges it.

JOHN BROWN JUDGES (REALLY MISJUDGES) HIS CIGAR

A leaf grown in light sandy soil or very light loamy soil, with clayey subsoil, usually affords a light yellow tobacco. Heavily manured soil produces a dark heavy leaf. Yet the color is no indication of the strength of the leaf—for while a dark leaf, not necessarily strong, can not be bleached without injuring its flavor, yet a light leaf, possibly strong in constituents, may be very readily darkened by processes subsequent to growth.

It is the heart of the cigar—the filler—that regulates the potency and pungency of the smoke—the wrapper is only for ornament and for protection, and only constitutes a very small percentage of the weight of the cigar.

The harvesting is done by partly stripping the leaves from their parent stem and permitting them to wilt. They are then gathered in piles or on racks and exposed to the action of sunlight. After

the completion of "yellowing," as the drying is called, next comes the vitally important process of curing. Curing brings about intimate chemical changes in the leaves. The object of the curing is to eliminate the excess sap and water, to fix the color by completing "yellowing," or first drying to fix the flavor and aroma by preservation of the juices and to give a certain toughness and suppleness to the leaf. This is all started by the "yellowing"—and is not completed until it passes through the fermentation process carried on by the manufacturer.

TOBACCO, TOO, TAKES THE SUN-CURE

All good cigar leaf tobacco is sun-cured, while pipe smoking and chewing tobacco are usually cured by artificial heat. In the latter process the temperature ranges for the first sixteen to thirty hours from 90 to 120 degrees F.; from then for the following forty-eight hours 125 degrees is necessary to complete the curing. Dry heat and flue curing are the best. Flue curing is done with pipes around the curing houses, the pipes being fed from a furnace in an adjoining room. Most cigarette tobacco is cured in this manner. The pores of the leaves are left open by this method, thus making them more absorbent to the flavoring sauces which are added to certain kinds of tobacco. A crude method used is that of curing by open fire. This takes four or five days and gives an undesirable smoky creosotic flavor to the leaf.

Sun curing takes from six to eight weeks and sometimes from three to four months, but it retains a far better flavor and aroma, so this method is used for almost all cigar tobacco. We advisedly say *almost*—for there is a kind of cigar tobacco, so anemic and sickly, that if ever it was cured it must have suffered a serious relapse. Air curing is done in open well-ventilated sheds at a temperature of about 75 degrees F. The leaf is usually allowed to cure while attached to the stalk, although Florida curers generally prefer to strip the leaf and treat it separately. The finer classes of pipe smoking tobaccos are air-cured.

Next the leaves are made ready for market and the sorting of them is a highly specialized and finicky job. We need not enter into this diversified business, for its nomenclature with its "carrotts," its "hands," its "prizes," etc., is involved and of no special significance.

The rehandling of the tobacco from this stage on, is largely conducted by the manufacturers of tobacco products. When the leaf is first received by them, it is opened in the casing room and in-

spected. Manufacturers who make various types of product, sort out the different kinds of leaf, suitable for each line, such as wrappers, fillers, binders, cigarette leaf, plug leaf, etc. These are then sent to their separate departments. When the tobacco is received it is usually brittle and dry, and so when the bundles are opened and loosely spread out on large trucks they are first sprayed with water. After the leaves have become pliable they are sorted and blended according to the purpose in view.

The selecting and blending of tobaccos is an important task and it requires considerable experience and expert knowledge to choose leaves of different strengths and qualities and by combining them give the desired blend. It is in this step that American manufacturers have made the greatest advance during the past few years in their products. The sorted packages are then roughly fastened together and after being again sprinkled thoroughly are sent to the "sweating" room to undergo fermentation. The temperature of this room is generally kept at about 90 degrees Fahrenheit, and the bundles are allowed to stay there several weeks.

There are three objects in the fermenting of the tobacco leaf: (1) removal of acrid matters, (2) fixing of the color, and (3) the production of flavor. The change which takes place is thought to be a chemical one, in which certain organic compounds stored in the plant are split up and others formed. This change is brought about by certain oxidizing ferments—or enzymes produced by bacteria. The starch in the leaf is converted to sugar and slowly consumed. The fats and gummy substances, also nicotine, are decreased and there is formed malic, citric and oxalic acids, all of which are essential in the production of the flavor of the finished product.

Some bacteriologists claim that the changes wrought in the leaves and the production of flavor are solely the work of bacteria. This view has never been fully proved or disproved; in fact it is quite likely that the result is due to both chemical and bacterial reaction.

"WINS ITS FAVOR THROUGH ITS FLAVOR"

The leaves are next cleaned, all sand and clay being removed, and are again packed in bundles and returned to the sweating department to undergo further fermentation. Finally the leaves are sent to the stemming department where the midribs, which usually form about one-third of the entire weight, are removed.

The ribs are sold to insecticide manufacturers. Tobacco, by the way, has definite insecticidal value, which it owes to its nicotine con-

tent. Strong solutions of nicotine sulphate (40 per cent.) are used in dilution with soapy water for spraying shrubs, flowers and vegetables to rid them of insect pests. Yet strangely enough tobacco growers are greatly bothered by case-hardened insects that thrive on the tobacco crop. There is a little upholstered worm, the larvæ of hawk moths, that does considerable damage to the leaf—and a little bug called by bugologists *Dicyphus minimum,* is also a great nuisance and extremely injurious to young plants.

But to return to the "ribs" discarded by the cigar manufacturers. One wise Dutchman conceived a process of ironing the midribs flat, using great pressure, and disposing them to that element of the cigar trade known as the "rope industry."

The process of stemming splits the leaf in two and the half-leaves are arranged in piles of fifty, each pile forming a "book." The leaves are next sent to the drying room, where any remaining moisture is removed by carefully regulated hot air currents. Then they go to the "ordering" room. There the "books" are inspected for color, size, etc., and if necessary subjected to more treatment. If not they are packed in cases and stored for several months to allow for perfect and uniform blending. Then they are ready for shipment to the factory.

Leaf to be used for chewing or pipe tobacco is not put through such an elaborate process as cigar leaf. Usually such tobacco leaf is fermented in bulk and the stems are removed before the principal fermentation. After the first selection of varieties, sorting, stemming and cleaning, the leaf is dipped into large flavoring vats and after drying is subjected to steaming.

Manufacturers of chewing tobacco are very particular about this "flavoring" process. I mean that they are more particular about the flavor than about the grade of the tobacco. Listen to this formula for such a flavor, and wonder why waste tobacco at all with it, when shavings or sawdust would work equally well.

Extract of cascarilla
Extract of licorice
Extract of valerian
Extract of asarum
Tonka bean
English rum.

Here perhaps the Prohibition Enforcement outfit have missed a guess. Perhaps the venerable cut plug hides a modicum of alcohol.

After the flavoring has been done the leaves are then packed away in bulk in the sweating room and there ferment slowly with constant turning until required for use.

Cigars have changed little in the last four centuries since they were first discovered in America. At that time the natives rolled up tobacco leaves which they smoked and which the Spaniards called cigars after the Spanish word *cigarer*—to roll. Although tobacco was introduced into Spain in the cigar form, it was not until about 1790 that cigars were used generally in Europe. One of the first factories for the manufacture of cigars was established in Hamburg in 1796.

In the United States the cigar trade is far more important than that of any other tobacco product, in fact, its value is greater than that of all other tobacco products combined. The number of cigars made in this country in 1924 and on which a tax was paid was ten and a half billions. Most of these are consumed in this country along with a good many more imported from Cuba. The immensity of the industry may be judged from the following facts:

THE TOBACCO CROP

In 1912 the world's recorded crop of tobacco was 2,696,401,379 pounds and in 1913 it was 2,722,190,030. Of this amount America and Asia each produced about 350,000 tons and Europe 250,000 tons. The principal Asiatic countries which produce tobacco are China, Japan, Afghanistan, India, Persia and Asia Minor, a great deal of China's tobacco being sold as "Turkish tobacco." Oddly enough, too, most of the Turkish cigarettes are made in Egypt. The amount of tobacco leaf produced annually in the United States varies from 700 million pounds to 1000 million pounds and about one-half of this is exported as leaf, and the other half manufactured here and consumed in the United States.

To produce this immense crop we find that there are almost two million acres of rich soil under cultivation and the value of the raw crop varies from $400,000,000 to $500,000,000, which gives an average value of from twenty to twenty-five cents a pound. On April 1, 1921, there was on hand 1,818,781,268 pounds of tobacco in the United States. The peak of average price was reached in 1919. That year the farmers sold 1,440,979,349 pounds ranging from seventeen cents in Pennsylvania to sixty-five cents in Louisi-

ana. The average of these states in 1911 was nine and one-half to thirty-one cents, and in 1920 it was twenty to forty cents. The peak production was reached in 1920, with 1,508,064,000 pounds, and the states producing the largest amounts were in the following order: Kentucky, North Carolina, and Virginia. That year the estimated average yield per acre was 796 pounds, as against 894 in 1911 (the record year).

The southern states raise the bulk of the tobacco crop. A great deal is exported, while the leaf raised in Connecticut, Pennsylvania, Ohio, Wisconsin, Florida, Massachusetts and New York is generally used for the cigar trade in this country.

Although the United States surpasses all other countries in tobacco production, there are large imports of leaf for cigars and cigarettes. In 1920 imports were 82,231,396 pounds, of which 18,856,091 pounds came from Asiatic Turkey, chiefly for cigarettes. Cuba furnished 23,616,999 pounds and Porto Rico 14,728,645 pounds. The value of tobaccos exported from this country in 1920 amounted to $288,693,799 and the number of cigarettes exported that year is astonishing, being 15,833,870,000. In 1919 the cigar factories of the United States employed 160,000 workers and manufactured $773,000,000 worth of cigars alone. Of interest, too, is the fact that Philadelphia is the largest cigar manufacturing centre in the world.

The manufacture of variously sized cigars and of cigarettes are technical processes which we pass by, except perhaps to stop at points of interest. The machine has not yet totally displaced the human hands in cigar making, although such machines have long existed. Smoking is a sentimental occupation and lends itself readily to romantic by-plays. Around the hand-made cigar still hangs a great deal of romantic glamour. Yet to the initiated there is more comfort in knowing that his smoke is made by an automatic contrivance that can not possibly *spit*. For in spite of tragacanth, in spite of mechanical moisteners, the old cigarmaker prefers to seal the tip of his or her hand-made product with the natural mucilage donated by salivary glands.

Of course it is claimed that the germs so included, without additional charge, only die a certain death, by virtue of the cigar's own disinfection—personally I am more comfortable with knowing that my cigar, whether it be the prosperous panatella or a more modest cheroot, is machine-made and not a hand-made crematory for micro-

scopic carcasses. Flavoring material is not used for high grade cigars—they stand on the merit of a good blend. For inferior cigars, however, flavors similar to those used for chewing tobacco are commonly used.

THE MUCH MALIGNED CIGARETTE

Something now about cigarettes. "Coffin nails, shroud bobbins and dope-sticks"—all are ugly terms that have been conferred on this little offender. Abiel's progeny have singled out this tiniest of my Lady Nicotine's weapons—as fair game for their cheap and silly sneers. Yet it is quite true that of all forms of tobacco used, the cigarette is least harmful—except of course in excess. Even the paper used for its cover has been absurdly abused. Full of chemicals and dope—positively poisonous—so ran these foolish attacks. As a matter of fact even the cheapest kind of paper so used has in it no deleterious material, either before or after combustion. Generally it is a vegetable paper from tree fibre or from flax, although it is often called rice paper. The imported French cigarette papers still go by that name yet there is in them no more rice than there is in a cupful of jello. Saltpeter is added, so they say, to cigars and other smoking tobaccos, to make them burn more uniformly. This is a rare addition today and should be discarded entirely. Burning butts are a sufficient fire hazard anyway without any combustible assistance. But we will have something to say later of cigarettes.

Snuff: Its manufacture is based on a long and thorough fermentation, during which time most of the nicotine, acids and essential oils are removed. Some manufacturers grind the leaf up into grain before fermentation and this is called wet snuff. Others wait until the fermentation is completed before grinding and this is called dry snuff.

"To abuse snuff," says Coleridge, "is to abuse the origin of the human nose." But snuff has gone the way of most Victorian luxuries, as the parlor stereopticon and whatnots and family albums. Yet it has its devotees, and some use has to be made of dust and sweepings from cigar factories. It will be a surprise to know that twenty-one million dollars' worth of snuff was manufactured in America in 1920, most of it, however, for export elsewhere, possibly to Sweden as Swedish snuff, or to the Land of MacTavish and Fergusson as Scotch Snuff—in return for some of Scotland's courtesies.

Snuff sniffing, once a most popular pastime, is said by some to be due to return to its catarrhal haunts. The jewelled snuffbox may

replace the cigarette case or compact, sneezing parties become more common than the kaffee klatch, and the hay feverite will be forced elsewhere to seek new symptoms and performances. That anatomical depression at the base of the thumb, commonly called the "snuff box," has fallen into sad disuse—but there is still a hope that it will retain its outlines till snuff comes back.

But, you will say that I have purposely neglected so far in my story the matter of tobacco abuse. How can one, without bias, best **TOBACCO ABUSE** answer the question as to whether the tobacco habit is good or evil? It is only the fanatic and the moral prude who would immediately and unequivocally condemn all use of the weed. Yet if temperance and moderation are to be our counsels, it can do no harm to say something of the dangers of excess.

It is quite conceivable that the average man may be able to regulate his consumption of tobacco to suit his desires, and yet be interested in some of the technical facts concerning it. Modern man lives in a perpetual plethora of poisons—and it is poison that eventually upsets him. Fortunately by virtue of some adjusting influence, he is able to shield himself against their action and to accustom himself to their presence. This is particularly true of some of the most common of poisons.

There are certain drugs to which the human system becomes accustomed, which must be taken in continuously increasing amounts to produce their reactions. Such a drug is morphine and to a lesser extent alcohol. Others can learn the crave without increasing its tolerance. Coffee, tea and tobacco are of this nature.

From a former lecture on a kindred subject delivered several years ago, I quote a paragraph or two, as being specially fitting at this juncture.

Take this tobacco habit. The body cells cordially hate it when with its juices "they are first acquent." Normally the human body is antagonistic to tobacco and its ingredients. This is the proper viewpoint to take of the tobacco habit, and in this I am bound to be supported by a certain group of well-meaning old ladies of both sexes, whose present endeavor is to eradicate from this land of the free and the home of the rave the pernicious, life-destroying weed familiarly known under such nom de plumes as Camels, Cincos and cut plug. I may be pardoned for referring at this point to a strictly personal matter on the ground, perhaps, that it has been a strictly personal matter with most of the gentlemen in this audience. I

say gentlemen advisedly, although it is alleged and rumored that this pernicious habit is extending its engulfing and paralyzing tentacles into feminine circles heretofore considered immune to its vicious influences.

THAT FIRST TASTE OF TOBACCO

But that is another story—we men all agree, however, that if the weed plays fair and exacts from its lady initiates the nauseating quintessence of seasickness that it exacted from us, its primary shriners, we shall never complain. By the way the stanza that Thomas Hood left out of his immortal "I remember"—is now in public print for the first time:

"I remember, I remember
My first tobacco spree,
The little corner of the plug
That Bob bestowed on me,
Now swallow hard—that's what he said,
And I obeyed, of course;
They took me home a limpid lump,
Of over-ripe remorse."

And that, I am certain, is the common experience of all devotees of the weed when first they try its tempting lure.

Around and about the boy's first cigarette or chew of strong tobacco are pressed in never-to-be-forgotten discomfort and discontent—life's darkest, deepest moments. Generally from then on, however, devotion to the weed is certain. The antipathy exhibited to the tobacco upon the first trial is quickly changed to honest regard, and in a few weeks, months or years, the habit has so grown upon the devotee that not good sense, regard for sanitation, or even the beseeching requests of a lady love can make him forego his old corncob or his filthy cut of plug. To be satisfied with this statement one only has to watch the honest satisfaction beaming on an old man's face as he sits in his slippers by the fireside, unconsciously conducting an experiment in destructive distillation, a capacious meerschaum still, hiding his countenance, and himself filling the part of an aspirating *worm* condenser. What a wealth of content he seems to extract out of that alluring weed and not even the Shah of Persia smoking his golden chandelier is happier than the bronzed old man condensing the vapors from a clay retort, holding back that which is good and chimneying out in coiling wreaths the incondensible smoke. By the way, I am told of the invention of a smokeless cigar. As a curiosity it may be interesting, but as a commodity it is worthless. For despite the gaudy lithograph upon the cigar band, and despite the extra cou-

pons, no real man would ever indulge in a cigar that did not offer special attraction by way of smoke, that wisps and curls and purls and spins in endless syncopation.

But the tobacco habit, despite the fact that the body cells are eventually taught to expect their daily dose of nicotine, belongs to the class of capricious and unnecessary idiosyncracies. An exertion of the will, conducted after clever propaganda and governed by proper principles, is always able to remove such a habit provided it is conceived at a season of the year removed from the New Year, when most resolutions go up in smoke anyway.

Yet again what strikes one as a most important fact regarding the use of tobacco, is that it actually does produce substances which even the most inveterate smoker would of necessity admit to be both poisonous and irritating. Soluble principles of the chewed leaf—constituents of smoke from cigar or cigarette or pipe, all contain in some measure or another a compound, a volatile alkaloid, belonging to that group of powerful substances which numbers among its members such poisons as morphine, atropine and strychnine.

This compound is Nicotine. The chemical formula of Nicotine is $C_{10}H_{14}H_2$. Its full Christian name is Beta-pyridyl-alpha-normal-methyl pyrrolidine—you will note its complexity.

SO THIS IS NICOTINE?

According to a pamphlet issued by the Life Extension Institute, "Nicotine is second only to prussic acid, or hydrocyanic, in the rapidity of its fatal effect. One cigar weighing a quarter ounce, and made of strong tobacco, contains enough nicotine to kill a non-smoker if the entire quantity be taken internally. The inimitable Slosson always emphasizes the potency of hydrocyanic acid by telling that one drop of it placed on the tongue of a dog is enough to kill a healthy man. The same can be said of nicotine.

Nicotine at first slows the heart and increases the blood pressure, subsequently the blood pressure is lowered, and the heart action becomes rapid. The "tobacco" heart is recognized by physicians as a definite pathologic condition. Cramer believes that a leech sucking blood from a habitual smoker dies in convulsions. He also believes that 100 cigarettes smoked and inhaled in one day may cause death.

Nicotine is a volatile alkaloid and since it is present in the plant as a salt (malate or citrate), it is rather readily soluble in water. The free alkaloid may be very easily released, however, from its hiding

place in the plant cell by coaxing it out with an alkali. Many smokers believe that the test to discover nicotine in tobacco is to blow smoke through a handkerchief and note the brown discoloration. This is not true. The brown color is caused by the tobacco oil which is found in all tobacco. Nicotine is a colorless, harmful drug, not distinguishable except by chemical analysis.

Recently harvested tobacco leaf contains, depending upon its source, anywhere from less than one per cent. to over five per cent. of nicotine. Recent analysis of an ordinary cigar, one of the popular sellers, made of a blend of domestic and Havana tobaccos, revealed a nicotine content of 1.48 per cent. carried out to a dry basis.

I have before me as I write a paper entitled "Investigations on Tobacco with Special Reference to Quality," by Henry M. Steece, Specialist in Agronomy, U. S. Department of Agriculture, Washington, D. C. Under his section on nicotine, he reports the nicotine content in Connecticut wrapper leaf as 2.89 per cent. after fermentation. He adds that the harsh quality of tobacco smoked is partially removed by re-sweating and ageing, "whereby the easily volatile nicotine is largely expelled." The scientific explanation of this is that the ammonia produced during the fermentation or sweating, releases the volatile nicotine.

As to Kentucky and other southern tobaccos used for pipe mixtures and cigarettes, he gives the nicotine content, for the lighter grades, such as we use in this country, at 1.54 per cent., although it ran as high as 5.56 per cent. in the grades that are used only for export.

The present generation of American smokers demands mild tobacco, with the result that all tobacco products for American consumption are made of leaf that has been well aged and that has been several times re-sweated. Therefore, analyses of tobacco in the field, hanging in the sheds, or having had only one sweat, does not truly indicate the nicotine content of tobacco that is ready for the consumer.

A most interesting table of nicotine content of tobacco appeared a few years ago in the English Medical Journal, *The Lancet*. It is apparently the result of a very well conducted piece of research. It is as follows:

	Per Cent. Nicotine in Tobacco	*Per Cent. Nicotine in Smoke from a Pipe*	*Per Cent. Nicotine in Smoke from Cigarette*
Virginia cigarettes	1.60	.60	0.12
French tobacco	2.60	2.20	0.95
Turkish cigarettes	1.38		0.51
Egyptian cigarettes	1.74		0.21
Pipe mixture No. 1	2.85	2.20	2.25
Pipe mixture No. 2	2.01	1.53	
Perique tobacco	5.30	1.27	0.57
Cavendish tobacco	4.15	3.85	
Latakia tobacco	2.35	1.20	
Havana cigar	0.64		0.20

From this analysis it appears that pipe mixtures and pipe smokes show the largest amount of nicotine.

Obviously, too, the chewer absorbs most nicotine, and the cigarette smoker the least. It is to be remembered that of the small percentage of nicotine in tobacco smoke only a still smaller portion is actually held in the smoker's system. The mild mannered and inoffensive person whose gastric equipment and respiratory department revolt against inhaling indeed absorbs but little nicotine, providing he does not too roughly treat the butt end of his cigar. Small thin cigars, which afford a small area behind the fire range, and smoked in a holder, will probably best fit such a person.

It has been my experience that the expensive eight-cylinder brunette cigars affected by the wealthy are a great deal richer in nicotine content than the modest nickel blonde.

Did some one say: "Are there not many substances other than nicotine in tobacco smoke?" Yes, indeed—furfurol, carbon monoxide, ammonia and pyridine compounds, picoline, possibly some formaldehyde, cyanogen compounds—and wood alcohol, all exist in tobacco smoke—and as stated, in amounts not always infinitesimal.

We have dealt gently with the cigarette when used in sensible numbers, but according to a recent authority, an inhaling fool can show an absorption of as high as 5 per cent. of carbon monoxide in the blood stream. A recent medical investigator found nicotine in the breast milk of smoking mothers, and nicotine should certainly be no part of a baby's diet. Tax figures for last year show that the

consumption of cigarettes in this country has vastly increased, due it said, to my Lady's addiction to this form of tobacco.

Dr. G. L. Schneider, optometrist of the University of California physics department, indicts tobacco because of the harmful effect of nicotine, etc., on the eyes. "Those who practice the science of optometry have definite proof that excessive smoking is detrimental," he said. "Toxemia is the frequent result; and toxemia resulting from over-smoking is not only one of the greatest factors in eye trouble but it is on the increase. Furthermore, tobacco poisoning, whatever the composition of the poison may be, is most severe in young people."

THE INDICTMENT OF MY LADY NICOTINE (CONTINUED)

Sir Humphrey Rolleston of the medical faculty of Cambridge in a recent lecture before the Harrowgate Medical Society has summed up the existing evidence pro and con as to what tobacco actually does to one, with the conclusion that it is not so bad as many would have us believe. There are several outstanding features, however, that are not so reassuring. Psychological tests show that smoking lowers mental efficiency from 10 to 23 per cent. While these results are not conclusive, said Sir Humphrey, it shows a definite lessening of capacity to work. It is also suggested that premature senility is induced in heavy smokers by the sedative action of nicotine on the nervous system.

Experimentally it produces definite degeneration of the arteries in rabbits, but authorities believe that if tobacco smoking is really a cause of arteriosclerosis, it is a slow one, so mingled with the general conditions of old age that discrimination of the actual factors are almost impossible.

"The effect on the stomach," said Sir Humphrey, "is important; X-ray bismuth meals have shown that after a short period of increased contractility the motility of the stomach becomes paralyzed for an hour or so; as the subjective feeling of hunger very probably depends on contractions, the relief of hunger by smoking may thus be explained; it is said that dilation of the stomach may thus result."

Don't inhale when you smoke if you want to get good grades, is the advice given to students by J. Rosslyn Earp, of Antioch College, who has just investigated the long-run effect of tobacco on college men. As a result of his research, he announces that those students who inhale the fumes of tobacco, regardless of whether they smoke much or little, have lower scholarship records than smoking students who do not inhale.

This fits in with the statement of a German scientist, who recently reported that inhalers take into their systems eight times as much nicotine as smokers who do not inhale.

Dr. Bainbridge (*The Cancer Problem*), an authority on cancer, states:

TOBACCO AND CANCER

"The mouth is a common seat of malignancy because of the wide possibility of irritation.

"A very common source of irritation associated with cancer of the lip and tongue arises from smoking. The pipe, cigar, or cigarette, being always held in the same position, by mechanical irritation, by burning, or perhaps as suggested by Lazarus-Barlow, by radio-activity, seems to start the erratic cell growth which terminates in cancer. It is important, therefore, for persons who cannot resist the inclination to smoke, to vary the position of the pipe, cigar, or cigarette and thus diminish the possible danger of cancer."

Where there is in one's immediate ancestry history of lip or tongue cancer, smoking should be very moderately done. Better for such a person is complete abstinence from it.

But, states the confirmed yet temperate tobacco smoker, excess is injurious with anything. Too much pie, too much pudding, too much tea, too many baths, too many mud-packs, too much money—all are injurious.

And that is possibly the sane viewpoint to take.

For, mind you, tobacco has also its virtues—and they must not be overlooked. Most guardedly I say that it is antiseptic—or according to the Bureau of Chemistry—it is bactericidal. But let us not forget that this, after all, is only indirect evidence of its toxicity. Oddly enough, however, the digestive enzymes of the saliva and stomach fluid seem to function better in its presence than they do without it. One drop of Nicotine, added to an acid pepsin solution hastens the digestion of coagulated albumen immersed in it. Pancreatin also more rapidly hydrolizes starch iodide when nicotine is added to it. But these things are observable only in glass stomachs—in the flask and test-tube. There is a difference of opinion among smokers as to tobacco's effect on digestion.

Sour stomach, or excessive production of gastric acids is the penalty paid by some for over-indulgence. Others are seemingly benefited by an after dinner smoke. Nevertheless it is generally accepted by physiologists that excessive use of tobacco is *not* good for digestion, in that it inhibits or prevents the secretion of the digestive

ferments. So, no matter what essence of tobacco may do in a test glass its reaction in the gastronomic apparatus is a totally different story. It is said that during the flu epidemic smokers and chewers were less commonly struck than non-smokers, because their respiratory tracts were made sterile with nicotine and other products of tobacco maceration or combustion. This I doubt.

Tobacco is said to be remedial in certain kinds of disease—yes—and this was one of its first uses. Wondrous properties were ascribed to its medicinal use and some of the old herbals describe its value, as the drug Petum, in a way that would be highly creditable to the modern advertiser of a patent medicine. It cured anything from an ingrown toe nail to a fit of alcoholic doldrums.

It seems certain, however, that tobacco does possess some medicinal virtue. Anyway it is a good emetic as most of us have self-proven. Six or eight grains of it will cause the stomach of a normal person to heave its contents in a perfectly perpendicular direction.

It has been demonstrated scientifically that most of its body reactions are actually due to an increased secretion of epinephrin or adrenalin. This may account for its value in asthma powders. During the Civil War and more latterly during the World War, some draftees tried to evade service by placing lumps of tobacco in the armpits, whereby they were temporarily much sickened and weakened and possibly on that account rejected for active service.

But it is from a psychologic standpoint that tobacco shows to best advantage. "To the sleepless, the worried, to him or her who is troubled in mind or vexed in spirit the pipe or cigar is a never-failing remedy to soothe and to cheer." Some men can only smoke when they have companionship, and the well-known soothing effect of cigarettes on the wounded can hardly be attributed to the amount of nicotine absorbed. Smoking does seem to have a certain effect on the higher intellectual centers. After a transient preliminary stimulating effect on mental processes, its sedative effect develops.

SOOTHING AND CHEERING IS MY LADY'S CARESS

How effectively the poet, whom I quote, has sung its praises, though one doubts that tobacco could of itself produce such a fine hallucination:

"A few more whiffs from my cigar
And then in Fancy's airy car
Have with thee to the skies.
How oft the fragrant smoke upcurled,
Hath borne me from this little world
And all that in it lies."—*Hood.*

and the gentle "Lamb" prince of good fellow English poets vows that

> For thy sake Tobacco I
> Would do anything but die.

Propositions to take alcohol out of beer and ale and liquors, and to take caffeine from tea and coffee, have not met with much favor—yet a recent discovery whereby nicotine is said to be removed from tobacco by a vacuum process without impairing its flavor may meet with a warmer reception. If it is true that nicotine or its combustion compounds play no part in the flavor or in the action of tobacco its removal should be helpful.

The Persian, when he smokes his elaborate pipe, or the Indian with his narghilli, wisely purifies the fumes by bubbling them with water. The long-stemmed clay pipe absorbs the noxious matter and so does the corncob contraption, but oh! when such pipes attain to senility—how atrocious they get. An old pipe is a two-fold atrocity. It has lost its defensive absorption value for the nicotine, and it has gained in offensive putrescence. 'Tis the resident of Galway or County Antrim, begorra, that knows how to smoke the pipe—and a short clay pipe he chooses—so short that the bowl burns his proboscis. And none but O'Harritty could handle that contraption, bowl downwards, yet never spilling the tiny wad of shag—till every atom of it goes up in smoke.

Tobacco smoke passed through tannin loses all its nicotine. I do not know whether a briar pipe owes its effectiveness to the fact that it contains much tannin or not, but did I indulge in pipeing I should prefer one made with a nut gall bowl and stem of pressed filter paper.

Another novelty in the tobacco line is artificial tobacco as reported in a French journal, *La Nature* (Paris):

SYNTHETIC TOBACCO

"Thin sheets of especially prepared paper are impregnated with nicotine, stained to the proper dark-brown color with dyes and perfumed with chemicals so that they have the proper tobacco odor, both before burning and when alight. Nicotine, the powerful oily drug which is the active principle of tobacco, was made synthetically some years ago by German chemists, so that there would be no difficulty about obtaining this drug for impregnation purposes, even without using any tobacco leaf at all. What oils or other chemicals are used to impart the necessary odors is not stated in the account. While the making of an

> artificial tobacco in this manner appears to be entirely possible, and probably cheaper than growing and curing the natural leaf, it may be considered doubtful whether smokers anywhere will accept the substitution happily."

I have been requested to say something of cures for the tobacco habit. In response to the request I submit the following episode: "My husband," remarked a Philadelphia matron to a group of friends, "was a confirmed smoker with a real tobacco heart when I married him five years ago, but now he never touches the weed."

"Great," said one of the group, "to break off a lifetime habit like that requires a powerful will." "Well, that's what I've got," said the wife.

But in the absence of a "powerful will," rinsing the mouth with a one-fourth of 1 per cent. solution of silver nitrate is said to be effective.

Oil of sassafras, diluted with alcohol, is also said to depress a tobacco appetite. So too does an attack of influenza, though only temporarily. But, all in all, the "cures" seem more offensive than the disease.

You've heard the story of the young gentleman who confessed to a none too gracious lady friend that he had been advised in early youth to quit smoking cigarettes else he'd be feeble-minded when he grew up. Her answer was: "Well, why didn't you quit?"

And so I bring my Story of Lady Nicotine to its close. I have exposed her virtues and her vices, yet in spite of all this, history shows that it matters little whether the tobacco habit is condemned or not, for it has survived more than one determined attempt at its prohibition. The "tobacco question" will only cease to be a problem when the millenium of common sense arrives. In the meantime, there will be enough difference of opinion to give rise to such quaint reflections as those recorded in the writings of the melancholy Robert Burton, whose words go something like this:

> "Tobacco, Divine, rare, superexcellent tobacco, which goes far beyond all the panaceas, potable gold and philosopher's stones, a sovereign remedy to all diseases, a virtuous weed if it be well qualified, opportunely taken, and medicinally used—but as it is commonly abused by most men who take it as tinkers do ale, 'tis a plague of mischief, a violent purge of goods, of lands, and health, the ruin and overthrow of body and soul."

RESEARCH ON PHARMACOPŒIAL PROBLEMS

Committee of Revision of the Pharmacopœia of the United States of America 1920—1930

UNDER THE BY-LAWS of the Pharmacopœial Convention, the Executive Committee of Revision is "authorized to carry on research work and to make preparations for the ensuing revision." With the "Tenth Revision" completed, the Committee has turned to this next task so definitely assigned by the Convention.

As the first step, all members of the General Committee of Revision were called upon for information concerning difficulties of the revision which, in their opinion, were not yet satisfactorily solved and for other suggestions for needed research within the scope of the Pharmacopœia.

The responses from those who had so arduously worked during the "Tenth Revision" for the perfection of the text revealed many yet unsolved questions, and these were studied and classified by the Executive Committee of Revision in a conference held in New York City. That these selected subjects may be available for further consideration by the members of the Committee of Revision and by the many other research workers in the medical, pharmaceutical and chemical fields, they are herewith published.

For convenience they have been classified under five divisions, each division having the direction of the corresponding members of the Executive Committee of Revision, one member serving as Chairman of the group. The divisions are as follows: (1) Therapeutics and Pharmacology; (2) Chemistry; (3) Botany and Pharmacognosy; (4) Pharmaceutical Formulas and Processes, and (5) Nomenclature, Tables and Miscellaneous Questions.

Additional copies of this list may be obtained by addressing the office of the General Chairman (see below), and any one desiring to undertake the study of one or more of the problems suggested or of assisting in one of the co-operative studies which are outlined is requested to address the Chairman of the group having charge of that particular study or to write to the General Chairman of the Committee of Revision.

It is very important that those undertaking these researches should indicate their intention to the Committee of Revision, that a record may be had of all proposed studies and that such assistance as is available may be extended.

It is understood, of course, that all such voluntary studies may be presented and published wherever and in whatever manner the author may desire, only that the facts may be available for consideration during the next revision.

THE U. S. P. COMMITTEE ON THERAPEUTICS AND PHARMACOLOGIC RESEARCH.

H. C. Wood, Jr., Chairman, with C. W. Edmunds, George W. McCoy and Torald Sollmann.

1. **Iron Citrate Solution for Hypodermic Use.** It is desirable to know the composition of commercial iron citrate solution sold for hypodermic use, and then to devise satisfactory standards for the solution.

2. **Stainless Iodine Ointment.** Is "stainless" ointment of iodine (as Ung. Iodi Denigrescens N. F.) equivalent to the U. S. P. ointment? The following should be studied:
   a. Determine absorbability of iodine through skin.
   b. Which ointment is best absorbed?
   c. Are the antiseptic qualities of the two ointments identical?

   (Iodine Petroxolin, N. F., might also be included in this study.)

3. **Ointment of Belladonna.** Is the U. S. P. X. formula suitable for absorption through the skin? Physiological tests should be made on human beings and on animals.

4. **Mercurial Ointments.** It is desirable to study and report on the relative efficiency of mercurial ointments as made with different fatty bases. This study may advantageously be extended to other official ointments.

5. **Cimicifuga.** Is Cimicifuga therapeutically useful? A report is desired covering:
   a. Opinions of clinicians who have used it.
   b. Experimental clinical study.

6. **Gelsemium.** This drug has been dropped from the U. S. P. It has been suggested that it should be restudied for evidence of its therapeutic value.

7. **Lobelia.** A restudy of the therapeutic value of this drug is considered desirable.

8. **Cannabis.** Is this drug worthy of retention in the U. S. P.? If so clinical tests should be conducted to indicate the comparative value of Indian and American Cannabis, and also the rapidity of deterioration in the drug and its preparations.

9. **Bacterial Vaccines.** Which of these are worthy of U. S. P. recognition?

10. **Infusion of Digitalis and Tincture of Digitalis.** A study should be made of the potency of the infusion and tincture of digitalis made by various methods.

11. **Cascara.** The U. S. P. X. demands that cascara be aged before use in medicinal preparations. This practice has been generally followed by manufacturers for a long time, but is it based on accurate information? If the literature does not reveal that tests have definitely proved the advantage of aging it would be desirable to investigate the question.

12. **Oil of Santal.** It is desirable that an investigation be made of the chemical and therapeutic properties of the commercial oils of sandalwood.

13. **The Assay of Veratrum Viride.** A satisfactory bio-assay for veratrum viride should be devised.

14. **The Assay of Ergot.** A study of the U. S. P. X. assay methods in comparison with other bio-assay methods for ergot is recommended.

15. **The Assay of Digitalis, Its Preparations and the Digitalis Groups.** The U. S. P. method for standardizing the heart tonics of the digitalis series should be further studied. One problem is the growing difficulty in obtaining frogs in sufficient quantity. Can a colorimetric or chemical method be devised to take the place of the biological method?

16. **Oleoresin of Male Fern.** A study of the biological and also chemical assay of Oleoresin of Male Fern is desirable, with a consideration of its introduction into the U. S. P.

17. **Biological Assays.** All bio-assay standards tentatively adopted by the Second International Conference on Biological Standardization should be tried in comparison with those of the U. S. P. X.

18. **Cod Liver Oil.** The methods for determining the antirachitic value of this and other related oils are important, and U. S. P. workers should co-operate with other investigators in this field.

19. **Strophanthin.** Strophanthin, being a mixture of glucosides, varies in toxicity on frogs when tested by the U. S. P. method for heart tonics. Variations have been reported in strophanthin from Strophanthus Kombe of from 0.00,000,05 Gm. per gram frog (equal to ouabain) to 0.00,000,1 Gm. per gram frog. Is it desirable to include in the U. S. P. a biological test such as is given for strophanthus, allowing for a certain range?
The U. S. P. X. recognizes strophanthin from S. Kombe only. The question has been asked: Why not from S. hispidus also? They should be studied for comparison.

20. **Pituitary Solution.** This solution is sometimes prepared with dilute acetic acid or other acid. This is not recognized by the U. S. P. X. Is acid necessary? If so suitable limits should be set, but if not required the U. S. P. text should forbid its addition.

21. **Ether and Chloroform.** Are the U. S. P. X. standards sufficiently rigid for the requirements of anaesthesia? The labeling of manufacturers would imply that such was not the case. As the medicinal use of both ether and chloroform is principally for anaesthesia, the U. S. P. specifications should recognize only the highest purity commercially possible. A commission of authorities should study this question.

22. **Sulphur Ointment.** The use of petroleum, is suggested instead of lard in this ointment. It is claimed to produce

a better-appearing and smoother ointment, but will it be equally efficient therapeutically? This will require a clinical study.

23. **Boric Acid Ointment.** Is the U. S. P. X. formula superior to that of the U. S. P. IX? A number of clinicians should be invited to use these two ointments and report comparative results.

THE U. S. P. COMMITTEE ON CHEMICAL RESEARCH

H. V. ARNY, Chairman, with FRANK R. ELDRED, CHARLES H. LA WALL, W. O. RICHTMANN and GEORGE D. ROSENGARTEN.

1. **Tablets—Standards and Assays.** Methods for assaying pharmacopœial substances in tablets and general specifications for tablets should be established.

2. **Cinchona Assay.** The specific details of the assay call for further study.

3. **Colorimetric Assay Methods.** A study should be made of standardized colorimetric assays for the accurate determination of minute amounts of alkaloids and other active plant principles in pharmaceutical products, such as:
   a. The morphine content of paregoric.
   b. The assay of digitalis.

4. **Alkaloids.** A further study is needed of the physical chemistry in the alkaloid assay of drugs.

5. **Assay of Anthraquinone-Bearing Drugs.** The colorimetric assay methods for anthraquinone drugs call for further investigation. Other proposed methods should also be studied, with the hope of providing a satisfactory assay.

6. **A Reconsideration of U. S. P. Chemical Tests in the Light of the Present Knowledge of Hydrogen Ion Concentration.**

7. **Electrometric Titration of Drugs Containing Alkaloids.** To make this method more useful numerous titrations should be made and curves plotted from the results obtained.

8. **Assay of Aloe.** A satisfactory method for the assay of aloe is needed. It may involve a new study of aloin and its reactions. No satisfactory process is now available.

9. **Assay of Oxgall.** No satisfactory process is now available. There is evidence of considerable variation in oxgall as regards the glycochollates and "bile salts." What is meant commercially by "bile salts"?

10. **Alkaloidal Assays.** A further study should be made of the methods suggested for the improvement of the alkaloidal assays of drugs and their preparations as given in the J. A. Ph. A., vol. I (1912), page 29.

11. **Capsicum and Oleoresin of Capsicum.** An assay method should be developed which would be more definite than the present organoleptic test.

12. **Chloroform Liniment.** An assay process should be devised and a maximum and minimum standard adopted.

13. **Automatic Devices for Extracting Alkaloids.** The methods suggested by the Bureau of Chemistry and claimed to be labor-saving and more accurate than those of the U. S. P. X [see Ind. and Eng. Chem., 17, 612 (1925)] should be carefully tested propably by a commission working on common samples.

14. **The Assay of Hyoscyamus and Its Preparations.** A further study of this assay (U. S. P. X.) is desirable.

15. **The Assay of Ipecac and Its Preparations.** A further study of this assay (U. S. P. X.) is desirable.

16. **Indicators for Alkaloidal Assays.** Work in the Bureau of Chemistry indicates that in some instances the indicators specified in the Pharmocopœia for alkaloidal assay do not give the correct neutral points. For example, methyl red and cochineal are not suitable for the cinchona alkaloids. This subject should be given further study.

17. **Glycyrrhiza.** A comparison of suggested assay methods is desirable, with a view of adopting an official method.

18. **The Manufacture of Spirit of Ethyl Nitrite.** A study of the methods of manufacture, especially with a view of greater stability, is desirable.

19. **The Assay of Sodium Cacodylate.** The U. S. P. X. assay calls for further study.

20. Differentiating Tests for Strong and Mild Silver Protein. A satisfactory chemical test is desirable. Those suggested should be studied and reported upon.

21. Assay of Alkaloidal Salts. This question should receive the immediate attention of the U. S. P. Research Committee. The majority of the alkaloidal salts of the U. S. P. contain water of crystallization. Many of these hydrated salts lose a portion of their water at relatively low temperatures. A notable example of this type is quinine sulphate, which loses all but about two molecules of water at 50 degrees C. or even lower. In conducting the research on alkaloidal assays these facts will have to be taken into consideration.

Another point that will have to be carefully investigated is the indicators to be used. Methyl red is generally considered the most suitable indicator for alkaloids, yet with some alkaloids it apparently gives low results.

22. Cresol. The U. S. P. X. specifications for cresol call for a careful investigation, especially giving consideration to uniformity in their phenol-coefficient.

23. Solubilities. The definition of the meaning of "very soluble," "freely soluble," "soluble," etc., in the U. S. P. X. is an advance in the direction of greater definiteness and precision. For practical purposes the degree of solubility conveyed by these terms may suffice, yet there may be instances where the solubility expressed by these terms is too indefinite. "Freely soluble," according to the definition, covers a solubility of from 1 to 10 parts. This is rather a wide range for this degree of solubility.

Such somewhat vague information is not in accordance with the other more precise figures for solubility occurring in the same paragraph. More precise statements of solubility will no doubt be appreciated by the users of the Pharmacopœia.

If it is not possible or practicable to give more precise solubilities instead of the solubilities conveyed by the descriptive terms, it is at least important to ascertain that the solubility of the various U. S. P. products in solvents now designated by "very soluble" or "freely soluble" does

fall within the range understood by these terms. The first thing to do would be to classify the chemicals for which the descriptive solubilities are given. This should be undertaken as a collaborative study, a number of laboratories taking part in the investigation.

24. **Lactic Acid.** There is a need for a study of qualitative tests for lactic acid, with particular reference to testing for lactates in the presence of other organic acids.

25. **A Study of the Tests for Caramel Color.** There is a need for improvements in the tests for the detection of caramel coloring in liquids where it has been added illegally for the purpose of deception.

26. **Solution of Epinephrine Hydrochloride.** It is suggested that a dependable formula for the 1 to 1000 solution of epinephrine hydrochloride should be included in the U. S. P., giving the degree of acidity, the amount and nature of preservative, the amount and nature of reducing agent to keep the epinephrine from oxidation, etc. Some manufacturers are adding chlorobutanol or other substances as a preservative. This is not provided for in the U. S. P. X. and should either be permitted or excluded by tests. The keeping qualities of the solutions and dilutions therefrom should, of course, be determined by recognized methods of physiological assay.

27. **Arsenic Trioxide.** A study should be made of its solubility in water, especially as to the influence of its physical form upon its solubility.

28. **Potassa Sulphurata.** A study should be made of its decomposition on aging and the possibility of stabilizers being introduced.

29. **Ammonium Carbonate.** A further study on its composition is desirable, with particular reference to the manufacture of aromatic Spirit of Ammonia.

30. **Chlorinated Lime.** It is desirable that there should be further study of the condition of its "active chlorine."

31. **The Pepsin Assay.** This assay calls for further study, providing, if possible, a more suitable substrata than egg white and a more definite end point.

32. **The Assay of Volatile Oils.** A study of the U. S. P. X. assays for the oils of eucalyptus, lemon and santal has been suggested as desirable.

33. **Peppermint Oil.** Positive tests should be devised for the exclusion of other peppermint oils which might be used as adulterants.

34. **Emetine Hydrochloride.** Emetine Hydrochloride (U. S. P. X.) is defined as containing "variable amounts of water of crystallization" and as losing "not more than 19 per cent. (water) upon drying." This makes a very unsatisfactory standard, as it permits two products, one of which is only 81 per cent. as active as the other, to be sold under the same designation. It is suggested that the article as found in commerce be investigated, with a view to more closely defining the amount of water the product should contain.

35. **Isopropyl Alcohol Test in Whisky.** A new test should be devised; that in the U. S. P. X. will not indicate certain isopropyl alcohols now on the market which are free from tertiary butyl alcohol.

36. **Extract of Malt.** The rate of deterioration should be studied and the assay improved, if possible.

37. **Microchemical Methods.** What Microchemical Methods for the identification or assay of plant constituents are applicable to the Pharmacopœial Texts?

THE U. S. P. COMMITTEE ON PHARMACOGNOSTIC RESEARCH.

EDWIN L. NEWCOMB, *Chairman*, with W. O. RICHTMANN.

1. **Microanalytical Descriptions of Vegetable Drugs.** A restudy of all U. S. P. X. descriptions and terminology is desirable for the purpose of perfecting the text.

2. **U. S. P. Color Standards and Color Nomenclature.** This subject is one calling for an extensive investigation, of a collaborative character.

3. **Standards for the Degree of Fineness in Powdered Drugs.** Further research is needed on the degree of fineness of powdered drugs best suited to yield the maximum of

therapeutic values most economically and under varying conditions. This means the preparation of samples of known botanical characteristics, of specific degrees of fineness and co-operation with pharmaceutical and assay groups. Work on percolation has heretofore been done with almost a complete disregard of the actual size of particles and the fundamental principles of osmosis.

4. **Organic Foreign Material in Vegetable Drugs.** Further research should be conducted on the organic foreign material in vegetable drugs for the purpose of adopting blanket standards for these impurities, as has been done for inorganic foreign material in the U. S. P. X.

5. **Vegetable Drug Standards.** It would greatly facilitate the work of the next U. S. P. revision if a report could be prepared containing recommended changes to bring about greater uniformity, scientific accuracy and completeness for the vegetable drugs of the Pharmacopoeia.

6. **Changes During the Drying of Vegetable Drugs.** It is desirable to determine the changes which take place in the therapeutic values of certain vegetable drugs from the fresh medicinal plant material to the dried drug. This would be possible through co-operative research with the medicinal men on the Committee who are in a position to carry on clinical work, and also with those who are in a position to carry on assay work. One of our more important specific drugs should be selected for intensive study along these lines.

7. **The U. S. P. X. Alcohol-Soluble Extractive Method.** There seems to be some danger of the U. S. P. X. method for alcohol-insoluble extractive giving consistently low results. Gum and balsamic resins contain volatile constituents that will be extracted during the alcohol-extractive determination. When this residue is being dried to constant weight at 110 degrees C. the volatile constituents will pass off, together with a small amount of water that may be present in the drug. In the case of Benzoin the volatile constituents are considered of therapeutic value, and preparations of this drug are often used as inhalants.

   In the U. S. P. X. method for alcohol-soluble extractives

the alco-hol-soluble material is dried to constant weight, which, of course, is free from the volatile constituents of the gum resin.

The loss in five samples of Benzoin extractive drug drying at 110 degrees C., as directed by the U. S. P. X., was 2.1, 4.98, 3.4, 2.4 and 3.5 per cent., respectively.

The method should be modified to avoid this error, possibly through a check against the dry insoluble residue.

THE U. S. P. RESEARCH COMMITTEE ON PHARMACEUTICAL FORMULAS AND PROCESSES.

WILBUR L. SCOVILLE, Chairman, with GEORGE M. BERINGER and JACOB DINER.

1. **Compound Mixture of Glycyrrhiza.** It has been reported that rapid decomposition of the ethyl nitrite occurs when using the U. S. P. X. formula for this mixture, gas being liberated and all ethyl nitrite being lost within 24 hours. The formula should be studied.

2. **Defatting Digitalis Tincture.** A test should be developed to prove that it has been defatted. Can some other solvent which is not so inflammable be used, such as carbon tetrachloride?

3. **Stability of Pharmaceutical Preparations.** This should be studied from the standpoint of two factors:
   a. Natural composition.
   b. External influences.

4. **Deterioration in Drugs Due to Enzymes.** A study should be made of glucosidal drugs, with a view of preventing the action of enzymes and the deterioration in the drug during drying, storage or transportation. Drugs suggested for this study are apocynum, convallaria, adonis and chionanthus.

5. **Precipitation in Pharmaceutical Galenicals.** The causes and prevention should be given further study.

6. **The Function and Value of Adjuncts to Menstrua.** This is a subject worthy of scientific study in all pharmaceutical preparations.

7. **The Extraction of Vegetable and Animal Drugs.** The official methods and other methods should be compared and studied and their value determined.

8. **The Effect of Hydrogen Ion Concentration Upon the Stability of Tinctures, Fluidextracts and Extracts.** This is a new field of investigation and seems to promise the solution of some long-standing problems. The following specific illustrations suggest the possibilities:

   Tincture of Aconite. The addition of about 2 per cent, of acetic acid or 0.1 per cent. of hydrochloric acid is suggested. Tincture of Aconite rapidly deteriorates without such an addition.

   Tincture of Digitalis. Experiments have been made with tinctures of digitalis adjusted to a variation in hydrogen ion concentration from pH 2 to pH 10. Excess acidity or alkalinity result in rapid deterioration, but no deterioration within two years was noted when the tincture was neutral. As normally made tincture of digitalis is not neutral.

   It is doubtful if it is actually known what preparations are stable and what preparations are unstable today, and under what conditions these that are unstable deteriorate and to what extent. It is not so long since it was discovered that aconite preparations were unstable, and it does not seems at all improbable that a systematic investigation of the stability of other potent pharmaceutical prepara- not seem at all improbable that a systematic investigation could be undertaken in a symstematic manner by the various universities and manufacturing laboratories it would be possible before the next revision of the U. S. P. to have rather thorough and complete information on the stability of many drug extracts and the condition under which they should be stored to assure the greatest possible stability. A tincture of the drug under examination should be prepared by the usual method of extraction and its hydrogen ion concentration measured. It should then be adjusted by the addition of alkali and acid respectively to various hydrogen ion concentrations, both above and below that naturally encountered. A portion of this material should then be placed in small containers of alkali-free glass so that the periodic examinations may be made. The earlier

examinations should be fairly close together, say every three months; later they can be extended to six-month periods and then to yearly. Preparations should preferably be kept under three conditions:

a. In cold storage.
b. At ordinary room temperature.
c. Under temperature conditions which stimulate summer heat.

Another portion of the preparation should be freed from all dissolved air by washing with nitrogen under vacuum and should then be adjusted to various hydrogen ion concentrations as above directed, bottled under nitrogen or vacuum but otherwise stored under the several conditions described for the first portion and observed at similar intervals.

Such a study would give definite information on the effect of temperature, air or oxygen and hydrogen ion concentration on the stability of the preparation when in storage for varying periods of time. Investigations of this character already published on Tincture of Aconite and Tincture of Digitalis indicate the possibilities of such an investigation with other drugs.

9. **The Preservation of U. S. P. Drugs and Preparations.** Another desirable study is the influence of light upon preparations now directed to be kept in amber-colored bottles. Also the influence of oxidation, hydrolysis, acid-reaction, heat (abnormal), temperature (normal), volatility, etc., the object being to insure better preservation of medicinal preparations and greater reliability. This would be primarily a check upon the present U. S. P. directions for preservation.

The following subdivision is suggested for this study:

a. Oxidation and reduction (ferrous salts, phenols, aldehydes, etc.).
b. Hydrolysis (tannins, sugars, glucosides, acetylsalicylic acid, etc.).
c. Acid and alkaline reactions (pepsin, bismuth, glandular preparations).

d. Catalytic decomposition (H_2O_2, oils, fats, etc.).
e. Light effects (galenicals, some alkaloids, phenols).
f. Exposure effects rather than oxidation [CO_2, absorption, volatility, heat effects (normal changes, efflorescence, deliquescence, etc.).

10. Tincture of Cantharides and Its Standardization. The extraction of cantharides is difficult, as solvents for cantharidin are few. The best solvent and methods for extraction of cantharides, its preservation and assay are deserving of further study.

11. Solution of Magnesium Citrate. It is claimed by some that the U. S. P. X. solution is too acid and also too strong. The entire question should be studied with the co-operation of clinicians. This should include the influence of (a) acidity and (b) strength on precipitation; the influence of the sugar content on precipitation through hydrolysis, the composition of the crystals which separate, a comparison of various solutions of magnesium citrate from the viewpoint of palatability, permanency and physiologic action.

12. Aromatic Waters. A study of the aromatic waters is desirable from the standpoint of the amount of oil dissolved under different conditions of manufacture, and with particular reference to a definite formula for making these preparations by distillation. (See J. A. Ph. A., vol. IX (1920), page 878.)

13. Tincture of Digitalis. It is desirable to investigate the rate of deterioration to be expected in Tincture of Digitalis when prepared by U. S. P. X. formula, and also what methods may be adopted to overcome such deterioration. (See also the effect of hydrogen ion concentration on Tincture of Digitalis, question No. 8.)

14. Ergot. The effect of menstrua on the activity of ergot preparations should be studied.

15. Fluidextract of Cimicifuga. It is suggested that this can be advantageously made with a lower alcoholic menstruum. Various alcoholic strengths should be tried.

16. **Extract of Nux Vomica.** A study should be made of the relative values of different acids in extracting this drug.

17. **Fluidextracts.** The fluidextracts of cinchona, ipecac and squill present present special problems in extraction, and both menstrua and methods of extraction should be studied.

18. **Resins.** There is need for the further study of the standardizing and assaying of these products.

19. **Tinctures of Cinchona.**. The two official tinctures need study from the standpoint of extraction, preservation and alkaloidal standard.

20. **Extract of Cascara Sagrada.** The U. S. P. X. basis for standardization is too variable. Some other should be devised; the extractive should be considered and other methods tried.

21. **Specific Gravity and Extractive (dry) of non-assayed Fluidextracts and Tinctures.** It is suggested that extractives should be taken by evaporating 5 cc. of the fluid in a shallow dish until most of the alcohol and water is expelled. Then dry for 3 hours in an oven at 100° C. Report in grams per 100 cc.

THE U. S. P. COMMITTEE ON MISCELLANEOUS RESEARCH TOPICS.

A. G. DuMez, Chairman, with Theodore J. Bradley.

1. **A Study of U. S. P. Nomenclature in the Light of Recommendations From the Second Brussels Conference (1925).** Those instances in which the U. S. P. X. is not in harmony with the recommendations of the Brussels Conference (1925) should be pointed out that that they may be available for consideration in the next revision.

2. **U. S. P. Tables.** What other tables may be advantageously added to those now in the U. S. P.? If there are any to be recommended they should be prepared now and thoroughly tried in practice.

ABSTRACTED AND REPRINTED ARTICLES

PRESENT DAY BEVERAGES FROM A HEALTH STANDPOINT*†

By J. W. Sale, B. A., M. A., Washington, D. C.‡

WHILE exact figures as to the production of carbonated beverages in the United States are not available, it is estimated that at least 6½ billion glasses and bottles of carbonated beverages were sold during the fiscal year ended June 30, 1923. This estimate is based on the Federal tax on carbonic acid gas used in beverages for the period in question. In addition to carbonated beverages, a considerable quantity of uncarbonated fruit juices in bottles, chiefly grape juice, and a large quantity of uncarbonated beverages in glasses, chiefly orange beverages, are being sold. Also, non-alcoholic cordials can be found on the market. Large quantities of non-alcoholic beverages are manufactured in the home from fruit, chiefly oranges and lemons, and from flavors in powder or syrup form. The Department of Commerce reported in its Census of Manufacturers for 1923 that the wholesale value of fruit beverages for that year was a little over $7,000,000.

In connection with the enforcement of the Federal Food and Drugs Act, the Bureau of Chemistry has made a careful study of beverages, especially with regard to composition of the flavors, flavoring syrups, etc., which are used in their manufacture and which are usually shipped in interstate commerce. The base of practically all sodas is the same and consists of sugar syrup acidulated with fruit acid or phosphoric acid and carbonated water. This part of the beverage has been conveniently designated "Soda Base." Individuality is obtained by combining the soda base with various ingredients designed to make the finished product pleasing to the special senses of sight, smell and taste. Carbonated beverages which are ready for

*Presented at third session of Food and Drugs of the Fifty-fifth Annual Meeting of the American Public Health Association, Buffalo, N. Y., October 13, 1926.

†Reprinted for *Long Island Medical Journal.*

‡Chemist in Charge, Water and Beverage Laboratory, Bureau of Chemistry, U. S. Department of Agriculture.

consumption, therefore, usually contain, in addition to the soda base, minute quantities of added color and flavor. Occasionally, foam solution is used to give a "bead" and sometimes sodas in common with some other food products contain a preservative. Stimulant type sodas contain caffeine. The orange beverages which are now so popular, frequently contain about 15 per cent. of orange juice, together with added fruit acid, orange peel flavor, color, sugar and water. Of course, some orange beverages dispensed in glasses are merely orange oil flavored drinks and do not contain any orange juice. The so-called non-alcoholic cordials, which are believed to be used to a considerable extent for mixing with liquor, in many cases closely resemble in composition the old-time alcoholic cordials except for content of alcohol.

The sweetening agent of practically all soft drinks is pure cane or beet sugar. The sugar used is ordinarily of a high degree of purity because sugar, which contains nitrogenous matter to the extent of 1 per cent. or more calculated as protein, is apt to cause spoilage. The sugar in acidulated beverages gradually changes over into invert sugar. In fact, this change takes place even in the absence of added acid if the beverage is carbonated. Due chiefly to their sugar content, soft drinks have a fuel or energy value of from 58 to 174 calories, which is greater than that of numerous other food products which are given a high rating by dietitians. Sugar substitutes, including corn and maltose syrups, corn and maltose sugars, and refiner's syrup, which were rather extensively used during the World War, are not now being employed to any appreciable extent in this class of food product. Occasionally, beverages which have a small local distribution are sweetened in part with saccharin, but our records show that a negligible proportion of such beverages are shipped in interstate commerce. Most states prohibit the use of saccharin. Saccharin is considered by the U. S. Department of Agriculture to be deleterious to health and its use in beverages or other food is believed to be within the inhibition of the act. Moreover, while sugar is a wholesome and nutritious food, saccharin has no food value and therefore the substitution of saccharin for sugar lowers and injuriously affects the quality of the beverages or other food products in which it is employed.

Most soft drinks are acidulated with citric, tartaric, or phosphoric acid. Acetic and lactic acids are used to some extent and our records show that solutions of the mineral acids, hydrochloric and

sulphuric, are sold to bottlers under fanciful names. Usually about 1 to 3 grains of acid per half pint of beverage are used. No serious objection, from a health standpoint, is made to the above-named acids, in the quantities in which they are used in beverages, provided they are free from harmful or deleterious ingredients. It may be mentioned, however, that tartaric acid is not assimilated to the same extent as citric and lactic acids. It is conceivable that phosphoric acid in soft drinks is more often useful as a food supplement than hydrochloric acid, and is certainly more useful than sulphuric acid. Beverages which contain fruit juice such as fruit-ades, frequently derive their tartness from the juices of lemons and limes and from highly acid berry fruit juices such as loganberry, gooseberry, and currant juices, the two last named being found in imported beverages and beverage syrups.

Carbonated water is used in the manufacture of soft drinks to give a pleasant, sharp taste. The bubbles of gas rising up through the liquid when poured into a glass give the beverage an attractive appearance. Carbon dioxide not only inhibits the growth of bacteria, yeasts and molds, but actually exerts a distinctly harmful effect upon the members of the colon typhoid group. The medicinal value of carbon dioxide, supplied in the form of carbonated beverages, is based on clinical evidence and such beverages are well thought of by some clinicians for lessening nausea and gastric distress and promoting the secretion of urine.

The impurities in carbon dioxide are chiefly sulphur compounds when the gas is obtained from coke or limestone and products of fermentation including higher alcohols and esters when the gas is obtained by the fermentation of low grade saccharine products. As these impurities tend to produce beverages with an "off flavor," it is a commercial practice to eliminate them to as great an extent as possible. Gas produced as a by-product in the manufacture of cereal beverages is likely to possess a "hop" flavor and is unsuitable for the manufacture of certain types of delicately flavored beverages. However, there is another kind of impurity in carbonated water which may not materially affect the odor or taste of the beverage and may therefore escape detection. This type of impurity consists of heavy metals such as tin, lead, zinc, etc., introduced through the corrosion of metallic containers by carbonated water. Such impurities may also be introduced by the action of acidulated syrup on metal pipe lines and metal containers. About three years ago a sample of root

beer was examined in the Bureau of Chemistry and found to contain 220 milligrams per liter of zinc, which is equivalent to 3.3 grains of zinc chloride per bottle of 15 fluid ounces. This beverage caused severe vomiting. Several other instances of gross metallic contamination of beverages have been called to the writer's attention. One of these was caused by allowing acidulated flavoring syrup to stand over a considerable portion of time in a syruping machine. While instances of gross contamination with metallic impurities are rare and probably do not occur any oftener in the beverage industry than in other food industries, it is possible that if a careful study were made of the composition of carbonated beverages, traces or even larger quantities of heavy metals would be frequently found, due to the extremely corrosive action of carbonated water and acidulated syrup on metallic containers. It is always desirable, of course, to keep the heavy metal content of food products down to the lowest possible minimum.

With a few exceptions it is a universal practice to color soft drinks. This practice has been long established and probably in most cases does not result in deception, provided the beverage is propertly labeled. Even beverages which contain a substantial quantity of fruit juice are frequently artificially colored, because the natural color of many fruit juices, such as that of the strawberry, fade rapidly. The colors which are used in beverages are the same as those used in other foods and consist of harmless coal tar dyes and harmless colors of vegetable origin. It is a matter of general knowledge that certain coal tar dyes have been recognized by the U. S. Department of Agriculture as suitable for use in food, provided they are free from harmful impurities. A system of control called "Certification" has been established to determine the purity and suitability for use in food of batches of these so-called "Permitted Dyes." The use in beverages, or other food, of unpermitted dyes is regarded as sufficient ground for prosecution under the Federal Food and Drugs Act. It is considered that permitted colors or mixtures of permitted colors have not been satisfactorily shown to be suitable for use in food unless they have been "certified." The records of the Bureau of Chemistry show that there is general compliance in the beverage industry with the requirements of the act relating to the use of artificial color. Incidentally, it is of interest to note that a seven fluid ounce bottle of artificially colored soda contains only

about two milligrams of color. This quantity is expressed in terms of pure color and is equivalent to 0.03 grain.

Commercial preparations called "gum foam" are sometimes used in certain beverages, especially birch beer, root beer, and sarsaparilla, to give the beverage a frothy appearance when it is poured into a glass. The foam-producing ingredient of these solutions is saponin. Certain varieties of saponin are known to be toxic and even minute quantities of them, when introduced into the blood stream, have the power of laking red blood corpuscles. Woodward and Alsberg* have suggested that saponins may hemolyze because they attack the cholesterol of erythrocytes. Beverages or other food containing the toxic varieties of saponin are adulterated under the Federal Food and Drugs Act. No saponin, with the exception of chemilirium, has yet been found that does not hemolyze or agglutinate red blood corpuscles at a reasonable concentration. When saponin, even if harmless, is used to give a fictitious appearance of body and therefore of food value, the beverage or other food containing it is regarded as adulterated.

The flavoring ingredients of soft drinks consist of aromatic substances derived from various parts of plants including buds or flowers such as cloves and chamomile, fruit, or parts of the fruit such as vanilla beans and peel of the citrus fruit, seeds such as grains of paradise and celery, roots such as ginger and sassafras, barks such as wild cherry and cinnamon, and stems and leaves such as sage and peppermint. Other natural flavoring ingredients are fruit juices including the juices of the citrus fruits and berry juices from cold packed fruits. A considerable proportion of sodas are flavored with synthetics consisting of esters and higher aldehydes and alcohols. Some of the synthetic flavoring ingredients formerly used, such as nitrobenzol, are generally recognized as being harmful to health. There is lack of extended information as to the physiological action of the present-day synthetic flavoring ingredients in the quantities which are employed in beverages.

Some beverages, especially those containing fruit juices, chocolate, and other ingredients which readily ferment, contain sodium benzoate and sulphur dioxide and more recently, hydrogen peroxide.

*H. E. Woodward and C. L. Alsberg: "A Comparison of the Effect of Certain Saponins on the Surface Tension of Water with Their Hemolytic Power." Reprinted from *The Journal of Pharmacology and Experimental Therapeutics*, Vol. XVI, No. 3, October, 1920.

The first two substances named are permitted under certain conditions, in beverages or other food shipped in interstate commerce. The Bureau of Chemistry does not believe that hydrogen peroxide is a proper ingredient of any food product. There is evidence of irritant and deleterious effects on the digestive tract, sufficient, it is believed, to warrant classing it as an adulterant, if actually present in the food. It is known that a great many state and local laws positively prohibit the use of hydrogen peroxide, at least in milk products. These prohibitions are based, no doubt, on knowledge of the probable deleterious effect of this agent. Other harmful preservatives, such as salicylic acid, boric acid, and formaldehyde, are seldom employed in beverages and when they are found, are considered sufficient ground for prosecution. In general, it may be stated that the Bureau of Chemistry does not encourage the use of preservatives in beverages or other food, since it is of the opinion that preservatives can be dispensed with in most instances.

The "stimulant type" of beverage contains caffeine which is either added as such or in the form of cocoa, tea, or coffee. When caffeine is added as such, the quantity is usually 0.5 grain or less per bottle or glass. When added in the form of coffee, tea, or cocoa, the quantity is frequently greater than 0.5 grain per bottle or glass. A beverage containing added caffeine in a quantity sufficient to cause injury to health is adulterated under the Federal Food and Drugs Act. The Bureau of Chemistry has made no announcement concerning the quantity of caffeine which is considered to be harmful. The Bureau holds that beverages not sold under distinctive names, and which contain added caffeine, should bear a plain and conspicuous statement of the presence of the added caffeine, as for example, "Caffeinated ginger ale."

In the last decade or so, bottle washing machines and other equipment for the sanitary production of bottled beverages have been brought to a high degree of perfection, and large sums of money have been expended in purchasing them. Bottlers maintain a national association which, in turn, supports a research organization at Iowa State College, Ames, Iowa. This research organization gives a great deal of attention to the sanitary quality of bottled beverages and has been instrumental in raising the standard of beverages in this particular. Many states have laws and regulations which control the manufacture of beverages from a sanitary standpoint. Greater control is being exercised over the purity of municipal water supplies

which are the ordinary source of supply of the water in bottled beverages, and more attention is being paid to the cleansing of glasses used at soda fountains. All of these factors have tended to improve the sanitary quality of beverages. Bottled carbonated beverages enjoy an advantage over other beverages because of the inhibiting action of carbon dioxide on the growth of yeast molds and bacteria. As previously mentioned, carbon dioxide has a marked germicidal effect on the members of the colon typhoid group of bacteria. However, time is necessary for the destructive action to take place and even then, under certain conditions, all of the bacteria in the bottled soda may not be killed. While there are of course exceptions, it may be stated in general that the sanitary condition of most bottled beverages and of beverages sold in glasses at soda foundtains is satisfactory and represents a marked improvement over the old-time products.

CORRESPONDENCE

THE AMERICAN JOURNAL OF PHARMACY SALUTES ITS OLDEST BROTHER.

Neuilly-sur-Seine (Seine), France,

December 7, 1926.

To Ivor Griffith, Ph. M.,
Editor of AMERICAN JOURNAL OF PHARMACY,
Philadelphia.

Dear Sir:

I have read in the beginning of the editorial of the number of your journal for September last, these two lines:

> "THE AMERICAN JOURNAL OF PHARMACY is the oldest journal of its kind upon this continent, and probably in the world."

Permit me to send you the simple document enclosed, in order to inform you that the *Journal de Pharmacie et de Chimie,* published by the Society of Pharmacy of Paris, began its existence in 1809, a century, therefore, plus seventeen years, which gives it sixteen years of age more than your venerable AMERICAN JOURNAL OF PHAR-

MACY, which might be its younger brother. Please note also that there are two numbers a month, in each one of which are published scientific memoirs, works of the members of the Society of Pharmacy.

By same mail you will receive a pamphlet relating to the celebration of the centenary of our French journal.

It is interesting, perhaps, on this present occasion, to recall that our Faculty of Pharmacy, of Paris, had its origin in 1578 by the liberality of the Parisian apothecary, Nicolas Houel, at the same time as his first botanical garden. It was after August 25, 1777, that this particular school became the College of Pharmacy, by a declaration of Louis XVI. Under the First Empire (Napoleon I) it took the title of "Ecole Supérieure de Pharmacie" (High School of Pharmacy), and finally, three years ago, it was raised to the Faculty of Pharmacy, entirely autonomous. The courses and pupils there are numerous, and each year a certain number of these pupils complete their studies by an inaugural thesis, in order to have the title of Doctor of Pharmacy.

Yours very truly,

(Signed) CHARLES PATROUILLARD,

Apothecary, corresponding member of the College of Pharmacy, of Philadelphia (for a long time—40 to 50 years).

SCIENTIFIC AND TECHNICAL ABSTRACTS

INDUSTRIAL ALCOHOL IS NOT GUILTY OF BOOTLEGGERS' CRIMES.—Because several scores of unfortunate, ignorant or too trustful customers were killed by criminally careless bootleggers at the Christmas holidays, there has arisen in the public press another wave of protest against industrial alcohol. All the usual charges of Government poisoning are reiterated in this latest outburst, and some new ideas are being introduced to show that the Government must be turned from its wicked ways.

One of the most popular pleas of the anti-prohibition haranguers is that the Government should not poison its people to enforce the

law against the beverage use of alcohol. It is even stated that the Secretary of the Treasury has said that he does not conceive it to be the duty of the Government to endanger the lives of the public in the enforcement of the law. Surely it is not difficult to see that it is lack of enforcement of the law, which enables criminals to sell poison as a beverage.

Then there is the old charge that the Government deliberately puts poison in (figurative) "rum." Even the copyboys in any newspaper office should know that the Government performs no denaturing operations. Furthermore, there is an equal confession of ignorance in the subsequent statement that Government agents had been ordered to use none but nonpoisonous denaturants.

The Government requires by law (and not by the prohibition law) that industrial alcohol shall contain certain ingredients in addition to ethyl alcohol. These are what make it industrial alcohol and differentiate it from whisky, wherein the alcohol is modified by the presence of water and certain aromatic derivatives of grain. The Government, through recognition of the United States Pharmacopeia, requires by law that spirit of nitroglycerin shall contain not less than one per cent. of nitroglycerin. This is what makes this spirit a potent medicament and differentiates it from spirit of lemon and other culinary flavors. Through recognition of the National Formulary, the Government requires by law that sodium arsenate shall contain about 24 per cent. of metallic arsenic in chemical combination. This is what makes this compound a poison and differentiates it from sodium chloride, the common, useful salt of the kitchen and the table. Industrial alcohol is no more a beverage than spirit of nitroglycerin is a flavor or sodium arsenate a condiment. But, like these latter two, it has its place in the general economy. Any one of the three may be misused, but the fault does not lie with the article so misused.

Fundamentally the fault which arouses so much misguided opposition to industrial alcohol is a fault of statutory law. Law is intended to regulate the actions of human beings. But, law has failed in this regard through inefficiency or corruptness in its administration. So, lawmakers have turned to solemn pronouncements against inanimate articles—and folks smile patronizingly at the taboo of the Polynesian!

One of the most dangerous of statements that have found their way into the public press is that which represents the Secretary of the Treasury as saying that the addition of four volumes of methanol

to one hundred volumes of ethyl alcohol in accordance with the revised formula for completely denatured alcohol No. 5 does not render the mixture poisonous. If this leads, as it naturally would, to the use of this mixture as a beverage, whose will be the fault? It is necessary to use poisonous denaturants in the preparation of industrial alcohol. Obnoxious agents are not sufficient. The human taste, which can relish some of the products now concocted in kitchen breweries and cellar distilleries, would not be deterred by any odor or taste which chemistry might devise.

In the *Oil, Paint and Drug Reporter* for August 16, 1926, we said that industrial alcohol is not a fault of the prohibition law, and that if this law has prostituted industrial alcohol, the fault lies with the law, and the fight should be waged directly against the law. This opinion has found support through reprinting of the article expressing it, in substantial newspapers in this city, in Washington, and elsewhere, and in the bulletin of the Board of Temperance, Prohibition and Public Morals of the Methodist Episcopal Church. We stand by that opinion, and we commend it to the consideration of those whose attack is carried on through more devious channels.

Abstracted by H. Leffmann.

(From the *Oil, Paint and Drug Reporter,* January 3, 1927.)

Carbon Bisulphide a Most Hazardous Liquid.—Carbon bisulphide is probably the most hazardous liquid in general use today. It can be ignited at any temperature as low as 20 degrees below zero, and when heated to only 300 degrees it ignites of itself. A fire once started is very difficult to control, the ordinary methods of extinguishing being practically worthless, and the choking fumes of sulphur dioxide given off making approach difficult unless there is ample ventilation. Furthermore, the vapors of carbon bisulphide are explosive, so that an additional serious hazard is present when this liquid is used in a confined space.

As in the case of gasoline, the pouring of carbon bisulphide from one container into another may generate static electricity and cause sparks. This hazard is apparently much more severe with carbon bisulphide than with gasoline because it ignites more readily. The use of metal containers largely eliminates this hazard provided the metal containers are brought into metallic contact before any pouring is done

from one to another. There is also little danger of static sparks when the humidity is high. A relative humidity of sixty per cent. or over involves little danger of ignition by static sparks. In rubber mills, dry cleaning establishments and other places where volatile flammable liquids are used in quantity it is frequently a practice to artificially humidify the air to sixty per cent. or more.

Fires in carbon bisulphide are very difficult to extinguish, ordinary extinguishing methods being comparatively ineffectve. Fires in in small containers may ordinarily be extinguished by placing a cover on the container or otherwise smothering it. In the case of any considerable quantity of liquid in a tank or open vessel the use of an ordinary fire extinguisher or water from a hose stream or automatic sprinkler is said to be ineffective. The best method of extinguishing fires in open tanks or vessels of carbon bisulphide is to flow water onto the liquid quietly, as from a low pressure hose stream, being careful to avoid spattering which will disturb the surface. The water being lighter than the carbon bisulphide it will flow over it and form a floating blanket which will exclude the air and stop combustion.

It is far preferable wherever possible to handle carbon bisulphide outside of main buildings and in case it is necessary to use it inside to have the quantities at a minimum.

Cod Liver Oil Applied Externally—Professor J. A. Nixon, Bristol, recently described some precautions he had found effective in the Pyrénées against insect bites ("British Medical Journal," II, 1926, 718). His colleague, Dr. A. T. Todd, suggested that quinine might prevent sunburn, and Mr. E. Lloyd (assistant pharmacist at the Bristol Royal Infirmary) told him that cod-liver oil would keep off mosquitoes and other biting flies. The smell of the cod-liver oil may at first be disagreeable, but one gets used to it in a few minutes, and the comfort of being able to go through the Pyrenean forests unbitten and unattended by the usual host of flies is enough to outweigh the disadvantages. Freedom from sunburn added greatly to their enjoyment of the mountains. Prof. Nixon had previously seen how quinine protected from the sun's rays in a case of pellagra under Dr. Todd's care. For travelling they packed the collapsible tube containing the ointment inside one of their climbing boots. The formula is: Quinine acid hydrochloride, 5 parts (dissolved 1 in 2 of water); anhydrous wool fat, 70 parts; cod-liver oil, 25 parts; ionone, q.s. The quinine is

dissolved in water and added to the wool fat, next the cod-liver oil is mixed with it, and finally ionone is put in to disguise the smell of the cod-liver oil. Cod-liver oil (it is also pointed out) is as effective for oiling the surface of small ponds, water-butts, and so on, to control the development of mosquito larvæ as paraffin, and does not make the water distasteful to cattle.—*Chemist and Druggist.*

First Aid to the Injured Dandelion—As first-aid surgeons, the leaves of common green plants have boy scouts or soldiers in battle beaten all hollow. They are constantly being wounded, by being chewed by cattle or caterpillars or other beasts big or small, or by being torn by wind or hail; yet they automatically close up the wound without complaint, effectively keeping out the germs and fungus spores that might start festering diseases, and finally healing over the spot smoothly and permanently. At a recent meeting of the American Association for the Advancement of Science, Dr. R. B. Wylie, of the State University of Iowa, told how leaves "carry on" when they are hurt.

The first thing that happens after a leaf is wounded, Dr. Wylie said, is the collapse and death of the cells of the tissue surrounding the injury. These frequently enclose air spaces, and they effectually block the "bleeding" of the sap. At the same time the cell-layers making up the upper and and lower surfaces curl inwards, and often meet and overlap. If latex or milky juice is present, as it is in lettuce, milkweed and many other plants, it hardens and forms a firm seal over the larger openings. Gums, resins, slimy secretions and other substances play similar roles. This "first aid bandage" of plants Dr. Wylie calls the "pseudocicatrice."

This is followed by the formation of the cicatrice proper, analogous to the cicatrice that forms in a flesh wound of man or an animal. The development of this more permanent healing tissue, Dr. Wylie said, seems to be stimulated by some kind of substances released by the crushed cells of the pseudocicatrice. The permanent healing starts leisurely and develops slowly; the initial steps are rarely taken in less than twenty-four hours, and noticeable evidence of its formation may not be found in less than ten days. In general, the cicatrice is formed by the rapid division of cells, closing up the usually loose tissue in the interior of the leaf with a solid barrier of small, thick-walled cells, which later enlarge and develop strengthening layers of cork or woody substance.

It all takes place so quietly and unobtrusively that few people, even among botanists, pay any attention to it; yet this automatic self-surgery of leaves is of immense economic importance. Without it, an injured leaf might bleed its parent plant to death by continuing to exude or evaporate sap for hours or days, or it might let the spores of disease-causing fungi enter the tissue, there to germinate and fill the plant with their deadly parasitic hyphae.—*Science Service.*

MEDICAL AND PHARMACEUTICAL NOTES

THE NEW "FOOD, DRUG AND INSECTICIDE ADMINISTRATION."—Twenty years of food and drug law enforcement have seen a gradual change in the attitude of the food industries from suspicion and positive enmity to cordial co-operation and enthusiastic assistance, declared Dr. P. B. Dunbar, assistant chief of the Bureau of Chemistry, United States Department of Agriculture, in an address given January 24 in Atlantic City at a convention of the National Canners' Association. "Food and drug inspectors," he said, "are no longer regarded as detectives or policemen, but as technicians who help manufacturers to produce legal and therefore marketable and profitable products."

"Officials whose duty is to enforce the food and drug law recognize," said Doctor Dunbar, "that American manufacturers of foods and drugs are almost universally committed to a policy of giving to the consumer an honest product conforming with every reasonable regulation, not only because it is the right thing to do but because it is the best business policy. They realize that the food and drugs act is designed to protect not only the consumer but legitimate industry, and that its broad purpose is corrective rather than punitive.

"In enforcing the law the Bureau of Chemistry proceeds on the theory that more is to be accomplished by demonstrating how the law may be complied with than by attempting to bring the greatest possible number of court actions. Where serious violations of the law occur, whether deliberate or the outcome of carelessness, there is no justification for refraining from punitive measures. But there are many minor violations, the result of ignorance or accident, that

can be corrected with even greater promptness than by court action, by calling the attention of the manufacturer to the situation and requesting his co-operation in discontinuing the objectionable practice.

"No change in the policy of methods or enforcing the food and drugs act is involved in the plan recently announced by the Secretary of Agriculture for creating a new administration embracing the regulatory forces of the Bureau of Chemistry. The secretary's recommendation, which has been approved by Congress and by the President, provides for combining the activities of the present Bureau of Chemistry in enforcing the food and drugs act, the tea inspection act, and the naval stores act, with the work of the board which now enforces the insecticide and fungicide act. The new organization will be known as the Food, Drug, and Insecticide Administration. Law enforcement policies, however, will remain unchanged. Any material change in the enforcement procedure would be disturbing to the industries affected, and would not give any compensating increase in the effectiveness of the law enforcement work.

"The laboratories of the Bureau of Chemistry, both in Washington and in the field, will operate under the new plan just as they have in the past, but under the Food, Drug and Insecticide Administration. Present policies will be continued. The reorganization is simply designed to permit more effective operation on the part of various agencies of the department."

INTERNAL REMEDIES USELESS AGAINST EXTERNAL PARASITES—In the quest for simple means of repelling or distroying external parasites of animals many laymen have come to put false faith in claims for internal remedies. So numerous and usually so worthless have the claims been, when subjected to scientific test, that the Bureau of Animal Industry, United States Department of Agriculture has issued a statement entitled, "Inefficiency of Substances Fed to Animals to Repel or Destroy External Parasites."

About twenty-five years ago the bureau carried out experiments in feeding sulphur to cattle or giving them water with sulphur or sulphur compound to ascertain whether such procedure had any effect on external parasites. No effect was ever observed. Similar tests were tried with sheep as far back as 1903 to ascertain any effect on sheep scab. The investigators found that internal remedies were useless.

At various times the bureau has received claims that certain drugs given to animals internally will protect the animals from flies. The Bureau of Entomology likewise has tested products recommended for chickens, in their feed or drinking water, to control lice, mites, and other parasites. The results of such tests have been uniformly negative.

In view of the many dips and other effective preparations that will control external parasites when applied to animals externally, much cruelty may be avoided and best results obtained at least cost by using only tested and proved methods. The general rule is: External remedies for external parasites, and internal remedies under proper prescription and use for internal parasites, most of which are worms. In the use of chemicals and drugs it is best to obtain the services of a trained veterinarian or other person having scientific knowledge of the products used.

NEWS ITEMS AND PERSONAL NOTES

RESEARCH IN PURE CHEMISTRY AT MELLON INSTITUTE.—According to Dr. Edward R. Weidlein, director, Mellon Institute of Industrial Research, University of Pittsburgh, there has been established in the Institute a definite department of research in pure chemistry, with Dr. Leonard H. Cretcher as the head. As a senior fellow of the Institute, Dr. Cretcher (A. B., Michigan, 1912; Ph. D., Yale, 1916) has been in charge of the institution's fundamental chemical studies since 1922, and has published jointly with several assistants and other members of the Institute a number of papers on the results of their organo-chemical researches.

As head of the new department, Dr. Cretcher will have supervision over all the Institute's investigations in pure chemistry and will also serve as an adviser to industrial fellows who are carrying on research on problems in synthetic organic chemistry. Dr. Weidlein says in his announcement of the departmental plans that Dr. Cretcher's activities will be operated as an integral part of the Institute and will be sustained by institutional subsidy. Dr. William L. Nelson (B. S., Trinity, 1920; Ph. D., Pittsburgh, 1926), who has been named as the first fellow in the department, was a member of the staff of the department of chemistry of the University of Pittsburgh during the period 1922-26.

Doctor Weidlein states that while Mellon Institute is primarily an industrial experiment station, it has always recognized the need of fundamental scientific research as a background and source of stimulus for investigation on behalf of industry. During the past five years the Institute has been giving a constantly increasing amount of attention to the encouragement and support of research in pure chemistry, and has been progressively successful in arranging for funds to devote to the prosecution of investigations not suggested by industry, but planned within the Institute and aimed towards the study of more basic problems than those usually investigated for direct industrial purposes. In the Institute's new department of research in pure chemistry this interest and work will be nurtured and given opportunity to expand.

INDUSTRIAL ALCOHOL MANUFACTURERS ESTABLISH FELLOWSHIP IN MELLON INSTITUTE.—The Industrial Alcohol Manufacturers Association has founded an Industrial Fellowship in Mellon Institute of Industrial Research of the University of Pittsburgh, for the purpose of studying denaturants, in order to find an ideal one, if possible. This would be a substance possessing such properties and physiological action that it would render ethyl alcohol undrinkable, but could not be separated in any way from the alcohol and would not injure it for technical uses.

The creation of this fellowship and its acceptance by Mellon Institute are especially noteworthy in objective. The Institute has, at the present time, about as many fellowships as can be efficiently handled; but in spite of this, Doctor Weidlein, its director, felt obliged to make room for this new fellowship on account of the public service which it is hoped will result from it.

Dr. Lewis H. Marks, executive secretary of the Industrial Alcohol Manufacturers Association, stated that the Board of Directors of the association has been moved to establish this fellowship in order to more fully carry out the following article in the organization's charter:

> "By co-operation among the Members of the Association, to promote and extend the use of industrial alcohol in all known legitimate channels, by research and experiment to find new legitimate uses therefor and all for the betterment, advancement and growth of the Industry as a whole; and to secure more

complete co-operation and co-ordination of the industry with the Army and Navy of the United States in any and all cases of emergency."

NOTABLE GROUP OF SCIENTISTS ENTERTAINED—*Brazilian, German and American Biologists and Physicians Guests of Milton Campbell*—On the evening of February 3d, a group of distinguished experts in serology, bacteriology and biological therapeutics assembled at the Philadelphia Art Club as the guests of Mr. Milton Campbell, President of the H. K. Mulford Company. The occasion was a dinner given by Mr. Campbell in honor of a number of research workers, whose names are known throughout the medical world because of their recent and important contributions. The event was of unusual interest and significance, not only as a method of complimenting the scientists on their work, but rather because it served to bring to the attention of both the medical profession and the lay public the fact that a great deal has been done in the last few years in developing new curative serums and disease preventatives.

GUESTS OF HONOR.

Seldom has a more interesting group of high-powered reasearch workers been brought together. Seldom have so many important research projects come in for recognition at the same time. The guests, in whose honor the dinner was given, included the following:

Dr. Alfranio do Amaral, who is everywhere recognized as one of the world's leading authorities on snakes, snake venoms and anti-snake-bite serums. Dr. Amaral is in this country on leave of absence from the Brazilian Government, and has organized and is directing the Antivenin Institute of America.

Dr. Harold Amoss, of the Biological Division of Johns Hopkins Hospital, Baltimore, in recognition of his pioneer work on erysipelas and the development of erysipelas antitoxin.

Dr. Harry Cheplin, until lately Associate Professor of Bacteriology at Syracuse University, whose name is everywhere known for his studies on the acidophilus bacillus and for the introduction of Acidophilus Milk. Dr. Cheplin has the distinction of being the first to have given Acidophilus Cultures by mouth for the purpose of modifying the intestinal flora.

Dr. Rudolf Degkwitz, the youngest man in Germany who holds the rank of full professor, is a specialist in children's diseases, and

during his stay in this country, is working in co-operation with the United States Public Health Service and the Mulford Biological Laboratories in a study of measles. He is the discoverer of Anti-Measles Serum.

Dr. Frank M. Huntoon, Medical Director of the Mulford Biological Laboratories, was honored for his important work in developing a specific for the treatment of pneumonia, and for his work on antibodies which has been generally accepted by the profession.

Dr. James C. Small of the Philadelphia General Hospital has won distinction for his research on the causative agent of rheumatic fever and for his discovery of a serum for this disease.

Many distinguished physicians and leaders in biological research joined with Mr. Campbell in acclaiming these research workers. The list of guests was notable and included the following:

Dr. Russell L. Cecil, of Bellevue Hospital, N. Y., a well-known authority on pneumonia.

Dr. Howard A. Kelly, of Baltimore, a world famous surgeon.

Dr. T. D. Appel, of Lancaster, the Secretary of Health in the cabinet of Pennsylvania's new Governor.

Dr. William C. Braisted, former Surgeon-General of the Navy, President of the Philadelphia College of Pharmacy and Science.

Professor Charles H. LaWall, Dean of the Philadelphia College of Pharmacy and Science.

Dr. George H. Meeker, Dean of the Graduate School of Medicine, U. of P.

Dr. W. A. Pearson, of the Hahnemann Medical College, and Dr. Frank C. Hammond of Temple University.

Others included were Drs. Alexander C. Abbott, Frederick S. Baldi, D. H. Bergey, A. A. Cairns, Judson Daland, J. C. Doane, Wilmer Krusen, E. B. Krumbhaar, John A. Kolmer, G. W. McCoy, Ross Patterson, John Reichel, David Riesman, F. E. Stewart and C. E. M. Sajous.

A New Eskay Product.—An entirely new and unique product under the trade name of Eskay's Glycero-Cod has recently been placed on the market by Smith, Kline & French Company, Philadelphia, manufacturers of the well-known Eskay's Neuro Phosphates. Their latest product is a 50 per cent. emulsion of cod liver oil made from the highest grade of Lofoten Cod Liver Oil, combined with calcium glycerophosphate in an extremely palatable form.

In conditions where the blood-phosphorus and blood-calcium are at low levels, Eskay's Glycero-Cod is specially indicated, just as it is in fractures and bone diseases generally. It is during childhood that faulty conditions of blood and bone usually occur, and the creamy nature of the emulsion makes it extremely acceptable to children. Eskay's Glycero-Cod is a strictly ethical preparation and is presented to the medical profession only, members of which are cordially invited to send to Smith, Kline & French Company, 105 North Fifth Street, Philadelphia, Pennsylvania, for samples and descriptive literature.

UNITED STATES FAR BEHIND EUROPE IN FIGHT AGAINST SMALLPOX—*Specialists Urge Universal Vaccination.*—The Health Section of the League of Nations, in a report just issued, states that smallpox "is becoming increasingly rare on the continent of Europe." The majority of cases in Europe, it is pointed out, are found in England where 748 cases were reported for the months of August and September, last.

In the United States, more than 27,000 cases of smallpox were reported during the first ten months of 1926. Though the figures for the entire year, when tabulated, will doubtless show a reduction in the number of cases over the two preceding years, the United States will still occupy an unenviable position, compared with European countries, so far as smallpox prevalence is concerned.

As a timely warning to the public and to those responsible for protecting the health of the public, the American Dermatological Association, at its recent annual meeting, adopted the following resolution:

> "Whereas, smallpox has been prevalent in various parts of the country for several years, and has assumed a malignant type with a mortality of 50 per cent. in some places, and
>
> "Whereas, this disease can be effectively prevented by the simple and harmless expedient of vaccination,
>
> "Therefore, the importance of maintaining and continuing an active campaign of vaccination is urged on all public health authorities, and legislative bodies are urged to provide the necessary legal authority for universal vaccination."

NEWS ITEMS FROM THE PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE—One of the most successful of many seasons of athletics is now being enjoyed at the Philadelphia College of Pharmacy

and Science. True to indication in evidence in the first part of the year the basketball team has very valiantly built up a record of ten victories and four defeats, and has the distinction of leading in both leagues in which they play.

The Eastern Intercollegiate Pharmacy League, a circuit of the pharmacy schools of Columbia University, New Jersey, Brooklyn and Philadelphia is in its first year and is doing much to bring more intimate relations between these institutions. Both faculty and students are deriving much benefit from these meetings on the basketball floor, and much is expected in later seasons when the league further expands. The Philadelphia pharmacists are leading in this league, but they must overcome strong opposition to stay at the top.

Then there is the City College League, a local group of schools in Philadelphia, wherein P. C. P. and S. is again the leader. This group is having a close race for the supremacy and the druggists must show their best form to come through ahead.

A Christmas party was given to the Bachelor of Science and post-graduate students at the college on December 17th. This is an annual affair, and is one of the outstanding events of the school year. A delightful program was rendered and Santa Claus arrived during the evening, and presented everyone with a little gift. The latter part of the evening was devoted to dancing, and the evening was suitably wound up with the singing of carols by the light of a huge Christmas tree which decorated the stage.

A dramatic society has been organized in the freshman class of the college, and they are preparing several small sketches to be given during the assembly periods which are held weekly.

A very interesting exhibit was prepared by Dr. Viehoever for the college as part of the recent convention of the American Association for the Advancement of Science at the University of Pennsylvania. It is the first time a pharmaceutical exhibit has ever been prepared for the association, and it aroused considerable interest.

The advanced operative pharmacy class have recently taken several trips through manufacturing pharmaceutical houses, among them, H. K. Mulford Laboratories, The Eavenson Soap Factory of Camden, N. J. and the George B. Evans Laboratories of Philadelphia, Pa.

Our Field Secretary, Dr. Robert J. Ruth, is now away on an extended trip and is working his way through the central southern states.

Our Dean, Dr. Charles H. La Wall, is the author of a tremendously interesting and comprehensive history of pharmacy. It is entitled "Four Thousand Years of Pharmacy," and is published by Lippincott and Company. It is told in a popular style and is not only fascinating reading for those who are directly concerned with this profession, but stirs the imagination of the layman who is endowed with a curiosity and interest in the growth of the sciences.

The new volume of Popular Science lectures which were delivered at the college during the season of 1925-1926 is now out. It is bound in heavy paper, and makes a nice addition to the library of all those who are interested in accumulating a general knowledge of scientific subjects. The lectures cover twelve interesting topics, given by men who are authorities in their lines.

OBITUARY.

It is with a great deal of regret that we note the passing away of two mothers—Mrs. Emma J. LaWall, of Philadelphia, and Mrs. H. Cook, of Wilmington, Del.

Both had been given the privilege to live to see their sons —Professors Charles H. LaWall and E. Fullerton Cook— occupying positions of eminence and respectability in their respective fields.

Most unfortunately Professor Cook is in Europe and because of the suddenness of the event was unable to pay his last respects to his beloved mother.

To the families of the deceased the *Journal* extends its deep sympathy.

BOOK REVIEWS

ARITHMETIC OF PHARMACY. By A. B. Stevens, Prof. Emeritus of Pharmacy, College of Pharmacy, University of Michigan. 2d Edition, revised and enlarged. 151 pp. and index. D. Van Nostrand Company, New York City.

A well-written book containing many problems for the student in pharmacy. It includes chapters on Weights and Measures, Thermometers, Specific Gravity, Specific Volume, Percentage Solutions, Alligation, Atomic and Molecular Weights, Volumetric Analysis, Measurements of Gases and also, very complete Saturation Tables.

The book seems too concise for the student to use without detailed explanation from the teacher. For example, the first page contains the metric table, but nothing is mentioned concerning what the Meter is or how the Liter and Gram were obtained from it or the relationship which exists between the various units.

The book is remarkably free from errors and can be highly recommended for the Teacher-Student method of teaching.

R. L. C.

EATING VITAMINES. By C. Houston Goudiss, Funk and Wagnalls Co., 1927; small octavo, 129 pages, 7 illustrations. Price $1.50.

This book which gives information concerning "how to know and prepare the foods that supply these invisible life guards, with two hundred tested recipes and menus for use in the home," is now appearing in its third edition.

This edition is not simply a republication of the last edition with a few paragraphs added at the end of a chapter at the end of the book to give an excuse for calling it a new edition.

Every chapter contains some new material and much rewriting is in evidence, particularly in connection with the discussion of vitamines D and E which have attracted much of the recent research.

The most valuable feature of this book from the standpoint of the dietitian is the excellent summary of sources of vitamines.

The section dealing with recipes and the one giving menus rich in vitamines will appeal to every person who gives thought to the home dietary and the chapter on Wholesome Foods for the Little Child will be very helpful to those who have children and who wish them to have a good start on life's dietetic highway.

One feature is lacking that would improve the book from the standpoint of one who wishes to use it for reference purposes. It deserves an index. However, the book is so small and so concise, and so readable that few who use the book would miss the index or count its absence a defect.

C. H. LA W.